

Exhibit 22

1 UNITED STATES DISTRICT COURT
2 SOUTHERN DISTRICT OF NEW YORK

3 IN RE: ACETAMINOPHEN -) MDL No. 3043
4 ASD-ADHD PRODUCTS)
5 LIABILITY LITIGATION) Case No.
6) 1:22-md-03043-DLC
7 THIS DOCUMENT RELATES TO:)
8) JUDGE DENISE
9 All Cases, 1:22-md-03043) COTE

10
11 WEDNESDAY, AUGUST 2, 2023

12 CONFIDENTIAL - PURSUANT TO PROTECTIVE ORDER

13 - - -

14 Videotaped deposition of Robert
15 Cabrera, Ph.D., held at the offices of Tracey
16 Fox & Walters, 440 Louisiana Street, Suite
17 1901, Houston, Texas, commencing at 8:55 a.m.
18 Central, on the above date, before Carrie A.
19 Campbell, Registered Diplomate Reporter,
20 Certified Realtime Reporter, Illinois,
21 California & Texas Certified Shorthand
22 Reporter, Missouri, Kansas, Louisiana & New
23 Jersey Certified Court Reporter.

24 - - -

25 GOLKOW LITIGATION SERVICES
877.370.DEPS
deps@golkow.com

Page 2

1 APPEARANCES:

2

3 TRACEY & FOX

4 BY: SEAN P. TRACEY (VIA ZOOM)

5 stracey@traceylawfirm.com

6 LAWRENCE TRACEY

7 ltracey@traceylawfirm.com

8 440 Loursiana Street, Suite 1901

9 Houston, Texas 77002

10 (713) 495-2333

11 and

12 KELLER POSTMAN LLC

13 BY: REBECCA KING

14 rebecca.king@kellerpostman.com

15 AMANDA HUNT

16 amanda.hunt@kellerpostman.com

17 ASHLEY BARRIERE (VIA ZOOM)

18 ashley.barriere@kellerpostman.com

19 ROSIE ROMANO (VIA ZOOM)

20 rosie.romano@kellerpostman.com

21 LAUREN SCHULTZ (VIA ZOOM)

22 lauren.schultz@kellerpostman.com

23 J.J. SNIDOW (VIA ZOOM)

24 jj.snidow@kellerpostman.com

25 150 North Riverside Plaza, Suite 4100

Chicago, Illinois 60606

(312) 741-5220

and

THE LANIER LAW FIRM, PLLC

BY: EVAN M. JANUSH (VIA ZOOM)

evan.janush@lanierlawfirm.com

CRISTINA DELISE (VIA ZOOM)

cristina.delise@lanierlawfirm.com

CATHERINE HEACOX (VIA ZOOM)

catherine.heacox@lanierlawfirm.com

126 East 56th Street, 6th Floor

New York, New York 11758

(212) 421-2800

Page 3

1 and

2 WATTS GUERRA LLC

3 BY: MIKAL C. WATTS

4 mcwatts@wattsguerra.com

5 HAILEY WATTS (VIA ZOOM)

6 hwatts@wattsguerra.com

7 RUSS ABNEY (VIA ZOOM)

8 rabney@wattsguerra.com

9 Millennium Park Plaza RFO

10 Suite 410, C112

11 Guaynabo, Puerto Rico 00966

12 (210) 447-0500

13 and

14 WAGSTAFF & CARTMELL

15 BY: LINDSEY SCARCELLO (VIA ZOOM)

16 lscarcello@wcllp.com

17 4740 Grand Avenue, Suite 300

18 Kansas City Missouri 64112

19 (816) 701-1100

20 and

21 KRAUSE & KINSMAN

22 BY: TRICIA CAMPBELL (VIA ZOOM)

23 tcampbell@krauseandkinsman.com

24 4717 Grand Avenue, Suite 300

25 Kansas City, Missouri 64112

(816) 200-2900

and

BEASLEY, ALLEN, CROW, METHVIN,

PORTIS & MILES

BY: W. ROGER SMITH, III (VIA ZOOM)

roger.smith@beasleyallen.com

218 Commerce Street

Montgomery, Alabama 36104

(800) 898-2034

Page 4

1 and

2 DOVEL & LUNER

3 BY: JULIEN ADAMS (VIA ZOOM)

4 julien@dovel.com

5 GREG DOVEL (VIA ZOOM)

6 greg@dovel.com

7 201 Santa Monica Boulevard, Suite 600

8 Santa Monica, California 90401

9 (310) 656-7066

10 Counsel for Plaintiffs

11 BARNES & THORNBURG LLP

12 BY: JAMES F. MURDICA

13 jmurdica@btlaw.com

14 SARAHE JOHNSTON

15 sjohnston@btlaw.com

16 MITCHELL CHARCHALIS

17 mcharchalis@btlaw.com

18 2029 Century Park East, Suite 300

19 Los Angeles, California 90067-2904

20 (310) 284-3880

21 and

22 BARNES & THORNBURG LLP

23 BY: DEANNA LEE (VIA ZOOM)

24 dlee@btlaw.com

25 555 12th Street N.W., Suite 1200

Washington, DC 20004-1275

(202) 289-1313

and

BARNES & THORNBURG LLP

BY: JESSICA BRENNAN (VIA ZOOM)

jessica.brennan@btlaw.com

67 East Park Place, Suite 500

Morrisstown, New Jersey 07960

(973) 775-6101

Counsel for Johnson & Johnson

Consumer, Inc.

Page 5

1 BARNES & THORNBURG LLP

2 BY: SANDRA M. KO (VIA ZOOM)

3 sko@btlaw.com

4 555 12th Street N.W., Suite 1200

5 Washington, DC 20004-1275

6 (202) 289-1313

7 Counsel for Costco Wholesale

8 Corporation

9 ARNOLD & PORTER, LLP

10 BY: RAYNE ELLIS (VIA ZOOM)

11 rayne.ellis@arnoldporter.com

12 250 West 55th Street

13 New York, New York 10019

14 (212) 836-8000

15 Counsel for Dollar Tree Inc.,

16 7-Eleven, and Family Dollar, Inc.

17 KING & SPALDING LLP

18 BY: EVA CANAAN (VIA ZOOM)

19 ecanaan@kslaw.com

20 1185 Avenue of the Americas

21 New York, New York 10036

22 (212) 556-2100

23 and

24 KING & SPALDING LLP

25 BY: LUKE BOSSO (VIA ZOOM)

lboss@kslaw.com

1700 Pennsylvania Avenue NW

Washington, DC 20006

(202) 737-0500

Counsel for Walmart Inc., and

Wal-Mart Stores, Inc.

MORRISON & FOERSTER LLP

BY: ASHLEY E. QUINN (VIA ZOOM)

aquinn@mfo.com

250 West 55th Street

New York, New York 10019-9601

(212) 468-8000

Counsel for Target Corporation

<div>Page 6</div> <div><div>1DUANE MORRIS LLP</div><div>2BY: DANA J. ASH (VIA ZOOM)</div><div>3djash@duanemorris.com</div><div>430 South 17th Street</div><div>5Philadelphia, Pennsylvania 19103</div><div>6(215) 979-1000</div><div>7Counsel for Dollar General, Dollar</div><div>8General Corporation</div><div>9</div><div>10</div><div>11SMITH SOVIK KENDRICK & SUGNET</div><div>12BY: DAVID M. KATZ (VIA ZOOM)</div><div>13dkatz@smithsovik.com</div><div>14250 South Clinton Street, Suite 600</div><div>15Syracuse, New York 13202</div><div>16(315) 474-2911</div><div>17Counsel for Rite Aid</div><div>18</div><div>19</div><div>20</div><div>21STONE DEAN LLP</div><div>22BY: JOSEPH A. LARA (VIA ZOOM)</div><div>23jlara@stonedeanlaw.com</div><div>2421052 Oxnard Street</div><div>25Woodland Hills, California 91367</div><div>(818) 999-2232</div><div>Counsel for The Kroger Co.</div><div>HAIGHT BROWN & BONESTEEL LLP</div><div>BY: KATIE M. TRINH (VIA ZOOM)</div><div>ktrinh@hbblaw.com</div><div>555 South Flower Street, 55th Floor</div><div>Los Angeles, California 90071</div><div>(213) 542-8000</div><div>Counsel for Unknown Party</div><div>ALSO PRESENT:</div><div>DANIEL OLIVO, Tracey Fox & Walters</div><div>LAURA SHANNON, summer associate, Keller</div><div>Postman</div></div>	<div>Page 8</div> <div><div>1INDEX</div><div>2PAGE</div><div>3APPEARANCES..... 2</div><div>4EXAMINATIONS</div><div>5BY MR. MURDICA..... 12</div><div>6BY MR. TRACEY..... 387</div><div>7BY MR. MURDICA..... 424</div><div>8BY MR. TRACEY..... 435</div><div>9BY MR. MURDICA..... 440</div><div>10</div><div>11EXHIBITS</div><div>12No. DescriptionPage</div><div>131OECD Series on Adverse Outcomes64</div><div>14Pathways No. 20. Binding of</div><div>15electrophilic chemicals to</div><div>16SH(thiol)-group of proteins</div><div>17and/or to seleno-proteins</div><div>18involved in protection against</div><div>19oxidative stress during brain</div><div>20development leading to impairment</div><div>21of learning and memory</div><div>222Rule 26 Rebuttal Expert Report of111</div><div>23Robert M. Cabrera, Ph.D.</div><div>243Multicenter Study of118</div><div>25Acetaminophen Hepatotoxicity</div><div>Reveals the Importance of</div><div>Biological Endpoints in Genomic</div><div>Analyses, Beyer, et al.</div><div>4A Role of Gene-Environment125</div><div>Interactions in Autism Spectrum</div><div>Disorder Is Supported by Variants</div><div>in Genes Regulating the Effects</div><div>of Exposure to Xenobiotics,</div><div>Santos, et al.</div></div>
<div>Page 7</div> <div><div>1VIDEOGRAPHER:</div><div>2BRIAN BOBBITT</div><div>3Golkow Litigation Services</div><div>4---</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div><div>11</div><div>12</div><div>13</div><div>14</div><div>15</div><div>16</div><div>17</div><div>18</div><div>19</div><div>20</div><div>21</div><div>22</div><div>23</div><div>24</div><div>25</div></div>	<div>Page 9</div> <div><div>15Comparative Toxicogenomics127</div><div>2Database, Acetaminophen</div><div>36Comparative Toxicogenomics128</div><div>4Database, Acetaminophen, Autism</div><div>5Spectrum Disorder</div><div>67Recessive gene disruptions in133</div><div>8autism spectrum disorder, Doan,</div><div>9et al.</div><div>108Can In-Utero Exposure to149</div><div>11Acetaminophen Cause Autism and</div><div>12ADHD?, Carr</div><div>139Acetaminophen use in pregnancy205</div><div>14and neurodevelopment: Attention</div><div>15function and autism spectrum</div><div>16symptoms, Avella-Garcia, et al.</div><div>1710Association of Cord Plasma222</div><div>18Biomarkers of In Utero</div><div>19Acetaminophen Exposure With Risk</div><div>20of Attention-Deficit/</div><div>21Hyperactivity Disorder and Autism</div><div>22Spectrum Disorder in Childhood,</div><div>23Jr, et al.</div><div>2411Rule 26(a)(2)(B) Expert Report of256</div><div>25Robert M. Cabrera, Ph.D.</div><div>12Amended Expert Report of Robert256</div><div>M. Cabrera, Ph.D.</div><div>13Acetaminophen use during266</div><div>14pregnancy and offspring attention</div><div>15deficit hyperactivity disorder -</div><div>16a longitudinal sibling control</div><div>17study, Gustavson, et al.</div><div>1814Pharmacovigilance Risk Assessment279</div><div>19Committee (PRAC) Minutes from the</div><div>20meeting on 30 August - 02</div><div>21September 2016</div><div>22</div><div>23</div><div>24</div><div>25</div></div>

<p>Page 10</p> <p>1 15 Case study on the utility of 298 2 hepatic global gene expression 3 profiling in the risk assessment 4 of the carcinogen furan, Jackson, 5 et al.</p> <p>6 16 Interval review charge questions 312 7 - February 2018, AOP Information</p> <p>8 17 TSI 1355: Acetaminophen and 331 9 Effects during Pregnancy, January 10 24, 2018. 11 FDACDER000145 - FDACDER000301</p> <p>12 18 Acetaminophen use in pregnancy: 364 13 Examining prevalence, timing and 14 indication for use in a 15 prospective birth cohort, 16 Bandoli, et al.</p> <p>17 19 Association of Prenatal 369 18 Acetaminophen Exposure Measured 19 in Meconium With Risk of 20 Attention-Deficit/Hyperactivity 21 Disorder Mediated by 22 Frontoparietal Network Brain 23 Connectivity, Baker, et al.</p> <p>24 20 Prenatal Exposure to 380 25 Acetaminophen and Risk of ADHD, Ystrom, et al.</p> <p>(Exhibits attached to the deposition.)</p> <p>CERTIFICATE.....445</p> <p>ACKNOWLEDGMENT OF DEPONENT.....447</p> <p>ERRATA.....448</p> <p>LAWYER'S NOTES.....449</p>	<p>Page 12</p> <p>1 DIRECT EXAMINATION</p> <p>2 QUESTIONS BY MR. MURDICA:</p> <p>3 Q. Good morning.</p> <p>4 A. Good morning.</p> <p>5 Q. Could you state your name for</p> <p>6 the record.</p> <p>7 MR. TRACEY: Jim? Jim, can you</p> <p>8 hear me?</p> <p>9 MR. MURDICA: Yes, sir.</p> <p>10 MR. TRACEY: Yeah. So before</p> <p>11 we get started, I think Rebecca has</p> <p>12 four or five articles that when Robert</p> <p>13 was preparing, he looked at his notes</p> <p>14 and found them, and they were not on</p> <p>15 his MCL. She's going to give those to</p> <p>16 you.</p> <p>17 There's also one article that</p> <p>18 was published like from two days ago,</p> <p>19 and until we get our agreement on how</p> <p>20 to supplement the articles that are</p> <p>21 continuing to come out, we thought we</p> <p>22 better hand it to you this morning.</p> <p>23 So Rebecca is going to give</p> <p>24 that to you now before we start,</p> <p>25 those -- those articles.</p>
<p>Page 11</p> <p>1 VIDEOGRAPHER: We are now on</p> <p>2 the record. My name is Brian Bobbitt.</p> <p>3 I'm a videographer for Golkow</p> <p>4 Litigation Services.</p> <p>5 Today's date is August 2, 2023,</p> <p>6 and the time is 8:55 a.m. Central</p> <p>7 Time.</p> <p>8 This video deposition is being</p> <p>9 held in Houston, Texas, in the matter</p> <p>10 of Acetaminophen, Tylenol, ASD/ADHD</p> <p>11 Products Liability Litigation for the</p> <p>12 United States District Court, Southern</p> <p>13 District of New York.</p> <p>14 The deponent is Robert Cabrera.</p> <p>15 Counsel will be noted on the</p> <p>16 stenographic record.</p> <p>17 Our court reporter may now</p> <p>18 swear in the witness.</p> <p>19</p> <p>20 ROBERT CABRERA, Ph.D.,</p> <p>21 of lawful age, having been first duly sworn</p> <p>22 to tell the truth, the whole truth and</p> <p>23 nothing but the truth, deposes and says on</p> <p>24 behalf of the Defendant Johnson & Johnson, as</p> <p>25 follows:</p>	<p>Page 13</p> <p>1 MS. KING: Okay. And I counted</p> <p>2 seven.</p> <p>3 MR. TRACEY: Okay. Sorry.</p> <p>4 MR. MURDICA: All right. Let's</p> <p>5 try this again. Anything else before</p> <p>6 we get started?</p> <p>7 MR. TRACEY: No, no, no. Sorry</p> <p>8 about that.</p> <p>9 MR. WATTS: Welcome to Houston,</p> <p>10 Jim.</p> <p>11 MR. MURDICA: Yeah. Yes, I'm</p> <p>12 sure those couldn't have been</p> <p>13 transmitted earlier than right now.</p> <p>14 Thank you.</p> <p>15 QUESTIONS BY MR. MURDICA:</p> <p>16 Q. Good morning.</p> <p>17 A. Good morning.</p> <p>18 Q. Please state your name for the</p> <p>19 record.</p> <p>20 A. Robert Matthew Cabrera.</p> <p>21 Q. Robert Matthew Cabrera, we've</p> <p>22 never met before right now; is that correct?</p> <p>23 A. That's correct.</p> <p>24 Q. How do you refer to yourself?</p> <p>25 A. Robert.</p>

<p style="text-align: right;">Page 14</p> <p>1 Q. Okay. How would you like me to</p> <p>2 refer to you during this deposition?</p> <p>3 A. Okay.</p> <p>4 Q. Dr. Cabrera, what are your</p> <p>5 qualifications as a doctor, sir?</p> <p>6 A. I have a doctorate in medical</p> <p>7 sciences.</p> <p>8 Q. Are you a medical doctor?</p> <p>9 A. I'm a medical scientist, not a</p> <p>10 medical doctor.</p> <p>11 Q. Are -- I understand you're part</p> <p>12 of a lab.</p> <p>13 Do the other people in the lab</p> <p>14 refer to each other as doctors when they're</p> <p>15 not medical doctors?</p> <p>16 A. If you're in the lab, we refer</p> <p>17 to each other as first names. If you're</p> <p>18 outside of the lab, then we generally refer</p> <p>19 to each other by our titles.</p> <p>20 Q. Okay. And you understand</p> <p>21 you're here in relation to a litigation,</p> <p>22 correct?</p> <p>23 A. Yes, I do.</p> <p>24 Q. And that's not your normal</p> <p>25 work; it's not litigation, right?</p>	<p style="text-align: right;">Page 16</p> <p>1 Q. Okay. And your focus through</p> <p>2 your career thus far has primarily been</p> <p>3 neural tube defects and major congenital</p> <p>4 malformations, right?</p> <p>5 A. I work primarily in neural</p> <p>6 development, which includes neural tube</p> <p>7 defects.</p> <p>8 Q. Okay. Has your focus in neural</p> <p>9 development been neural tube defects?</p> <p>10 A. Predominantly, yes.</p> <p>11 Q. And predominantly it's been in</p> <p>12 identifying causes and finding protective</p> <p>13 measures to prevent them; is that fair?</p> <p>14 A. We look at both the cause and</p> <p>15 the prevention of birth defects, including</p> <p>16 neural tube defects.</p> <p>17 Q. And in this litigation, you</p> <p>18 submitted an expert report in June; is that</p> <p>19 right?</p> <p>20 A. That's correct.</p> <p>21 Q. It was about 200 pages?</p> <p>22 A. Approximately.</p> <p>23 Q. A week later you amended your</p> <p>24 report, correct?</p> <p>25 A. That's correct.</p>
<p style="text-align: right;">Page 15</p> <p>1 A. No. It's not my normal,</p> <p>2 everyday job.</p> <p>3 Q. Okay. Who employs you in your</p> <p>4 everyday job?</p> <p>5 A. Baylor College of Medicine.</p> <p>6 Q. Does Baylor College of Medicine</p> <p>7 know that you're here today?</p> <p>8 A. I'm on vacation.</p> <p>9 Q. Okay. Does Baylor College of</p> <p>10 Medicine know the opinions that you've put</p> <p>11 forth in this litigation with respect to the</p> <p>12 acetaminophen?</p> <p>13 A. I'm not submitting them on</p> <p>14 behalf of Baylor.</p> <p>15 Q. Okay. So they have not taken a</p> <p>16 position one way or another whether it's</p> <p>17 appropriate for you to opine on acetaminophen</p> <p>18 outside of work?</p> <p>19 A. I have not.</p> <p>20 Q. Okay. Do they know you're</p> <p>21 doing this work?</p> <p>22 A. They do not.</p> <p>23 Q. Your training is primarily in</p> <p>24 teratology; is that right?</p> <p>25 A. That's correct.</p>	<p style="text-align: right;">Page 17</p> <p>1 Q. Okay. Why did you amend your</p> <p>2 report?</p> <p>3 A. There was some minor edits that</p> <p>4 needed to be corrected that we had noticed.</p> <p>5 Q. What do you mean "we had</p> <p>6 noticed"?</p> <p>7 A. Well, reading through the</p> <p>8 documents afterwards, it was -- there were</p> <p>9 some things that were done that were left</p> <p>10 incomplete and needed to be corrected.</p> <p>11 Q. So were they things you added</p> <p>12 to or things you corrected?</p> <p>13 A. Corrections, just corrections</p> <p>14 that were made.</p> <p>15 Q. Did you remove anything?</p> <p>16 A. Specifically, I don't -- I</p> <p>17 don't recall that we removed anything.</p> <p>18 Q. You don't recall that you</p> <p>19 removed anything?</p> <p>20 A. No.</p> <p>21 Q. Did you add anything?</p> <p>22 A. Edits. There was edits as far</p> <p>23 as -- just edits.</p> <p>24 Q. Typos or anything substantive</p> <p>25 to your recollection?</p>

<p style="text-align: right;">Page 18</p> <p>1 A. Not anything substantive, just</p> <p>2 typos, typographical errors.</p> <p>3 Q. So between your original report</p> <p>4 and your amended report a week later, there</p> <p>5 were no substantive changes?</p> <p>6 A. I didn't make any substantive</p> <p>7 changes, no.</p> <p>8 Q. Okay. At some point you</p> <p>9 provided a further supplemental report</p> <p>10 related to one article, correct?</p> <p>11 A. That's correct.</p> <p>12 Q. And just now I was handed</p> <p>13 additional articles.</p> <p>14 Are those articles that you've</p> <p>15 reviewed?</p> <p>16 A. Yes, they are.</p> <p>17 Q. Okay. Are they articles that</p> <p>18 you have additional opinions about?</p> <p>19 A. They're consistent with my</p> <p>20 opinions that I've put forth in my report and</p> <p>21 my supplemental.</p> <p>22 Q. Okay. Is there anything you</p> <p>23 reviewed since your supplemental report</p> <p>24 that's not consistent with your report that</p> <p>25 you haven't provided?</p>	<p style="text-align: right;">Page 20</p> <p>1 the way it was presented. The hypothesis</p> <p>2 would put forth that there was an</p> <p>3 all-or-nothing effect.</p> <p>4 What has been shown is that</p> <p>5 early exposures, even before organogenesis</p> <p>6 with specific teratogens, have been noted to</p> <p>7 be able to produce malformations and not</p> <p>8 necessarily produce an all-or-nothing with</p> <p>9 those early exposures, and two of those</p> <p>10 examples would be retinoic acid and alcohol.</p> <p>11 Q. Okay. And going beyond the</p> <p>12 14 days, there are some structural defects</p> <p>13 that can be induced by teratogens, right?</p> <p>14 A. Yes.</p> <p>15 Q. And with time, we've come to</p> <p>16 learn that some of them are induced at</p> <p>17 specific times, like cleft lip, for example.</p> <p>18 Is that fair?</p> <p>19 A. There is what's referred to as</p> <p>20 critical windows of exposure that tend to</p> <p>21 define when particular organ systems are</p> <p>22 susceptible to teratogenic effects of</p> <p>23 teratogens.</p> <p>24 Q. And is one of those cleft lip?</p> <p>25 A. Yes. There's a -- there's a</p>
<p style="text-align: right;">Page 19</p> <p>1 A. No.</p> <p>2 Q. Okay. Do you have a draft of</p> <p>3 an additional report in the works now or</p> <p>4 anything like that?</p> <p>5 A. I think -- I haven't started a</p> <p>6 new draft, no, not for the --</p> <p>7 Q. So as of today, I have in</p> <p>8 writing whatever your opinions are, correct?</p> <p>9 A. I believe so, yes.</p> <p>10 Q. Okay. I want to talk to you a</p> <p>11 little bit about teratology in early</p> <p>12 pregnancy in particular.</p> <p>13 In the first 14 days of</p> <p>14 pregnancy, do you generally agree that any</p> <p>15 teratologic event is an all-or-nothing event?</p> <p>16 A. Classically that was believed.</p> <p>17 That is not necessarily the case, and that's</p> <p>18 been shown with -- particularly with alcohol</p> <p>19 and retinoic acid. Those are exceptions.</p> <p>20 Q. There's been so few mitoses in</p> <p>21 the first few days of pregnancy that an</p> <p>22 environmental effect or a teratological</p> <p>23 effect would most likely kill the embryo.</p> <p>24 Is that fair?</p> <p>25 A. Classically, that's -- that's</p>	<p style="text-align: right;">Page 21</p> <p>1 time window as well for clefting or cleft</p> <p>2 lip.</p> <p>3 Q. And would you say 21 to 28 days</p> <p>4 is the key window for that?</p> <p>5 A. That would actually be a little</p> <p>6 bit early for cleft lip.</p> <p>7 Q. Is that anything that you've</p> <p>8 ever studied, Doctor?</p> <p>9 A. Cleft lip?</p> <p>10 Q. Yes.</p> <p>11 A. Yes.</p> <p>12 Q. And specifically the</p> <p>13 teratologic window for cleft lip?</p> <p>14 A. Yes.</p> <p>15 Q. Okay. How about for autism?</p> <p>16 What's the teratologic window for autism?</p> <p>17 A. So the neurodevelopment in the</p> <p>18 human, it's continuous with neurulation,</p> <p>19 which is the start of neural tube closure and</p> <p>20 continues throughout gestation through both</p> <p>21 the second and the third trimester of</p> <p>22 pregnancy.</p> <p>23 Q. Yeah, okay. And I'm asking</p> <p>24 specifically about autism.</p> <p>25 When is the teratologic</p>

<p style="text-align: right;">Page 22</p> <p>1 effect that can -- I assume your testimony</p> <p>2 here is that a teratologic effect can cause</p> <p>3 autism in development, right?</p> <p>4 A. Yes.</p> <p>5 Q. And when is the window for that</p> <p>6 teratologic effect for autism specifically,</p> <p>7 not neurodevelopment?</p> <p>8 A. Right. Well, it coincides</p> <p>9 because autism is a neurodevelopmental</p> <p>10 disorder. A teratogenic effect that occurs</p> <p>11 during its critical window of exposure, which</p> <p>12 includes development of the nervous system,</p> <p>13 and the development of the nervous system</p> <p>14 continues throughout gestation, both the</p> <p>15 second and third trimester.</p> <p>16 Q. Okay. And so when would be the</p> <p>17 first window that a teratogen can affect the</p> <p>18 neuro -- neurological development?</p> <p>19 A. So we've shown that -- in the</p> <p>20 animal model that it coincides with</p> <p>21 neurulation, so we can do exposures as early</p> <p>22 as eight and a half days of gestation which</p> <p>23 is the beginning of the neural tube closure,</p> <p>24 which would coincide with approximately, as</p> <p>25 you mentioned, 14 to 28 days in pregnancy.</p>	<p style="text-align: right;">Page 24</p> <p>1 animal models and also consistent with</p> <p>2 the studies of fever in humans.</p> <p>3 QUESTIONS BY MR. MURDICA:</p> <p>4 Q. A neural tube defect, which you</p> <p>5 referred to earlier in the early part of</p> <p>6 neurologic development, that would be much</p> <p>7 more profound than autism, correct?</p> <p>8 A. Yes. It's a severe congenital</p> <p>9 malformation. It's often not compatible with</p> <p>10 life.</p> <p>11 Q. When you were first -- you're a</p> <p>12 member of the Teratologic Society, right?</p> <p>13 A. I -- what was referred to as</p> <p>14 the Teratologic Society, which I still like</p> <p>15 to think of as the Teratologic Society, I am</p> <p>16 still a member, yes.</p> <p>17 Q. You're still a member.</p> <p>18 You're not a member -- are you</p> <p>19 familiar with OTIS?</p> <p>20 A. I -- I am.</p> <p>21 Q. You're not a member of that,</p> <p>22 are you?</p> <p>23 A. I am not.</p> <p>24 Q. Were you ever invited to be?</p> <p>25 A. No, I haven't applied.</p>
<p style="text-align: right;">Page 23</p> <p>1 And during that critical window</p> <p>2 of exposure in the animal model, we're able</p> <p>3 to produce autism in animals that have been</p> <p>4 exposed during neurulation, so as early as</p> <p>5 neurulation, but continues throughout</p> <p>6 pregnancy.</p> <p>7 Q. Okay. So is it fair that the</p> <p>8 most critical -- to say that the most</p> <p>9 critical window to induce autism in the</p> <p>10 opinion of Dr. Cabrera is 14 to 28 days of</p> <p>11 the human pregnancy?</p> <p>12 A. That is not my opinion, no.</p> <p>13 Q. Okay. Please state for the</p> <p>14 record Dr. Cabrera's opinion as to the most</p> <p>15 important time for a tera -- teratogenic</p> <p>16 inductions of autism in human pregnancy.</p> <p>17 A. So --</p> <p>18 MR. TRACEY: Objection. Form.</p> <p>19 THE WITNESS: So throughout</p> <p>20 neurulation and neural development,</p> <p>21 that is the critical window of</p> <p>22 exposure. I think the time of most</p> <p>23 sensitivity would be during the second</p> <p>24 trimester of pregnancy.</p> <p>25 And that's been supported by</p>	<p style="text-align: right;">Page 25</p> <p>1 Q. Okay. When did you first take</p> <p>2 an interest in autism in particular,</p> <p>3 Dr. Cabrera, in your research?</p> <p>4 A. So for the last five years,</p> <p>5 I've been working on another compound that</p> <p>6 was associated with neural tube defects, and</p> <p>7 part of what we're doing is behavioral</p> <p>8 testing.</p> <p>9 So that's when I started to</p> <p>10 look at interactions and some overlap between</p> <p>11 early neural development and autism spectrum</p> <p>12 disorder, behaviors in animal models.</p> <p>13 Q. And you're doing that at</p> <p>14 Baylor?</p> <p>15 A. Yes.</p> <p>16 Q. And what's the compound?</p> <p>17 A. Dolutegravir. It's an HIV</p> <p>18 antiviral.</p> <p>19 Q. And is that funded by any</p> <p>20 particular company?</p> <p>21 A. It's funded by the National</p> <p>22 Institutes of Health, the National Institutes</p> <p>23 of Mental Health.</p> <p>24 Q. Whose drug is that, if</p> <p>25 anybody's, or is it an old drug?</p>

<p>Page 26</p> <p>1 A. No. No. It's -- I can 2 double-check on that, but maybe Gilead. 3 Q. Okay. I want to talk to you a 4 little bit about the human brain for a 5 minute. 6 Where in the human brain are 7 the features that result in autism? 8 A. So different parts of the brain 9 have been associated with autism. I don't 10 know that there's any one portion of the 11 brain that specifically causes autism as a 12 neurobehavioral disorder. 13 Q. So, in other words, whatever -- 14 well, do you believe that there are 15 structural abnormalities in the brain of 16 patients with autism? 17 A. Those have been documented 18 in -- and, you know, one example is there was 19 a publication in the New England Journal of 20 Medicine by Stoner that demonstrated what 21 I -- what I refer to as neural layering 22 defects, and those are predominantly in the 23 frontal and occipital cortex. 24 Q. But your testimony here today 25 is that the structural manifestations of</p>	<p>Page 28</p> <p>1 the hippocampus that are either signs or 2 causal for autism? 3 A. There have been documented some 4 structural changes. Actually, one of the 5 papers we gave you today shows some 6 structural changes in the hippocampus that 7 were associated with acetaminophen exposures, 8 particularly in the autism model. 9 Q. Yeah. And my questions were 10 about human beings, and I think what you're 11 referring to is a study in mice, correct? 12 A. That is correct. 13 Q. Out of Wuhan, China? 14 A. Yes. 15 Q. Are you familiar with the lab 16 there? 17 A. I'm -- not particularly. 18 Q. How important is your reliance 19 on a mouse hippocampus study from Wuhan, 20 China? 21 A. It's part of the totality of 22 evidence. I've considered it. 23 Q. Okay. But you had the opinions 24 you're going to talk to us today before 25 seeing that study, right?</p>
<p>Page 27</p> <p>1 autism can be in any portion, any anatomic 2 portion, of the human brain? 3 A. Well, not any anatomic portion. 4 It would be predominantly those involved in 5 executive function, reasoning, although some 6 other ones have demonstrated that there's 7 also some cerebellar involvement in some 8 patients with autism. 9 Q. So what -- tell us the anatomic 10 regions of the brain where there would be 11 structural changes that are a part of autism 12 or indicative of autism? 13 A. So what's been documented 14 includes impacts on the neural laminal 15 layers, which -- largely different areas of 16 the cerebral cortex and then also the 17 cerebellum. 18 Q. Okay. How about the 19 hippocampus? 20 A. There is some data to support 21 interaction with the hippocampus as well. 22 Q. Okay. And I -- you used the 23 word "interaction." I didn't ask about 24 interaction. 25 Are there structural changes in</p>	<p>Page 29</p> <p>1 A. Yes. 2 Q. At what point did you come to 3 the conclusion that acetaminophen -- 4 acetaminophen causes autism -- well, we'll -- 5 do -- we'll take it one at a time. 6 At what point in time did you 7 come to that opinion? 8 A. So while I was reviewing the 9 literature systematically, I realized that 10 there was a -- had accumulated an 11 overwhelming amount of evidence that 12 supported that position. 13 Q. Okay. And was that in 2023? 14 A. Yes, that's this year. 15 Q. Okay. And were you 16 doing that -- were you systematically 17 reviewing the literature for fun or for some 18 other reason? 19 A. Because I was asked to. 20 Q. Okay. You were asked to, not 21 for your job, right? 22 A. For the -- for why I'm here 23 today -- 24 Q. Yeah. 25 A. -- as a consultant.</p>

Page 30

1 Q. And I'm going to ask you the
2 same question for ADHD.
3 At what point in time did you
4 come to the conclusion that acetaminophen
5 causes ADHD in human beings?
6 A. It's concurrently.
7 Q. In other words, concurrently in
8 2023?
9 A. Yes.
10 Q. Had you ever looked at
11 literature on acetaminophen and autism prior
12 to 2023?
13 A. I looked at literature on
14 acetaminophen generally, and I had also been
15 following it sometime during COVID, but
16 not -- hadn't conducted a systematic review.
17 Q. Right.
18 And hadn't conducted a review
19 with respect to autism or ADHD in particular,
20 correct?
21 A. Incorrect. I had been
22 reviewing studies, particularly the
23 meta-analysis that had been published in the
24 last several years for my own class.
25 Q. And what class is that? The

Page 31

1 nutrition class?
2 A. No. I also teach two other
3 classes. One of them is medical
4 biochemistry, in addition to a genetic
5 counseling class, and it was for the genetic
6 counseling class.
7 Q. Okay. And what degrees or
8 board certifications do you have in genetics?
9 A. I'm not a -- my boss is a
10 board-certified geneticist. I'm not a
11 board-certified geneticist.
12 Q. And why are you talking about
13 your boss?
14 A. Well, the class, I was referred
15 to as being able to teach this class. And so
16 that was who referred me as a -- said that I
17 could teach the class.
18 Q. Does your boss teach the class,
19 or do you teach the class?
20 A. I teach the class.
21 Q. Okay. So you teach a class
22 about genetics and are not certified in
23 genetics in any way, correct?
24 A. Well, the person -- again, my
25 boss, and then also the person that is the

Page 32

1 primary instructor, is certified in genetics.
2 So I'm a lecturer in that class.
3 Q. Oh, I see.
4 So the class, if we looked at a
5 syllabus -- or the class is actually taught
6 by your boss?
7 A. So, well, my boss's colleague.
8 Q. Correct?
9 Okay. Now I'm just confused.
10 If we went and looked at the
11 program for the school, does it say
12 Dr. Cabrera is the professor?
13 A. As a lecturer.
14 Q. Okay. So much like I go to
15 Baylor as a guest lecturer in a law class,
16 that doesn't make me a professor, correct?
17 A. No, not unless you're appointed
18 a professor.
19 Q. Okay. Are you appointed a
20 professor?
21 A. Associate professor.
22 Q. In -- at Baylor or at UT or
23 where?
24 A. At Baylor.
25 Q. Okay. Where do you teach your

Page 33

1 nutrition class?
2 A. So I'm not currently teaching
3 my nutrition class. I was teaching it at San
4 Jacinto College and also UT in Austin.
5 Q. And your nutrition class, was
6 that more in the vein of maternal nutrition
7 to prevent neural tube defects?
8 A. It's, let's say, a core class.
9 So we were required to teach a class as part
10 of our faculty appointment, and I was
11 teaching a core credit class in nutrition.
12 So it was a general science class.
13 Q. Was that the first class you
14 were -- you ever regularly taught?
15 A. No, it was not.
16 Q. Okay. What was the first class
17 you ever taught?
18 A. I -- before that, I was
19 teaching a class in the philosophy of science
20 as well.
21 Q. And does the philosophy of
22 science have anything to do with autism or
23 ADHD?
24 A. It did not, no.
25 Q. Okay. And you said you teach a

<p style="text-align: right;">Page 34</p> <p>1 biochemistry class right now?</p> <p>2 A. That's correct.</p> <p>3 Q. And what degrees do you have in</p> <p>4 chemistry or biology or biochemistry?</p> <p>5 A. I trained in biology.</p> <p>6 That's my -- my undergrad was in biology.</p> <p>7 Q. Okay.</p> <p>8 A. And the class that I teach, I</p> <p>9 teach genetics in that class. That's -- I</p> <p>10 cover the genetics lecture in that class. So</p> <p>11 I'm the lecturer in that class.</p> <p>12 Q. And is the audience medical</p> <p>13 students?</p> <p>14 A. There's two different</p> <p>15 audiences. One is graduate students. We</p> <p>16 have a graduate student section, and then I</p> <p>17 also teach a professional student section,</p> <p>18 which is physician's assistants and</p> <p>19 orthopedic and nurse anesthesiologists. So</p> <p>20 not medical students, professional students.</p> <p>21 Q. Okay. I asked you a couple</p> <p>22 minutes ago about when you first became</p> <p>23 interested in autism, and I think you said</p> <p>24 you've been working on a compound for the</p> <p>25 last five years in relation to that.</p>	<p style="text-align: right;">Page 36</p> <p>1 medication and so we looked at that as well.</p> <p>2 And so while we were doing</p> <p>3 behavioral studies on those animals, we also</p> <p>4 looked at the effect of in utero exposure on</p> <p>5 the behavior of offspring, and that was where</p> <p>6 we started to look at autism.</p> <p>7 Q. Okay. And that was a -- you</p> <p>8 said that was a follow-up grant, right?</p> <p>9 A. That was -- yeah, that was a</p> <p>10 follow-up.</p> <p>11 Q. When did you get that follow-up</p> <p>12 grant?</p> <p>13 A. About three years ago.</p> <p>14 Q. Okay. So is it really three</p> <p>15 years then you've been looking at autism?</p> <p>16 A. Well, that's when we got the</p> <p>17 grant to look at that, yes.</p> <p>18 Q. And then you began after that,</p> <p>19 correct?</p> <p>20 A. Right. Right.</p> <p>21 Q. Okay. So it's not five years.</p> <p>22 You weren't studying autism five years ago,</p> <p>23 correct?</p> <p>24 A. Initially we were studying</p> <p>25 neurodevelopment, and then that led into us</p>
<p style="text-align: right;">Page 35</p> <p>1 How does the compound that</p> <p>2 you're doing -- how does your research relate</p> <p>3 to autism? Is it whether the drug induces</p> <p>4 autism?</p> <p>5 A. So initially there was a report</p> <p>6 that there was neural tube defects in</p> <p>7 Botswana that happened just over five years</p> <p>8 ago, approximately five years, and we</p> <p>9 followed up that study with producing an</p> <p>10 animal model of that that would show that it</p> <p>11 was fully responsive. And we've followed</p> <p>12 that up with now a mouse model that's also</p> <p>13 shown that it's fully responsive just to show</p> <p>14 that this drug can produce neural tube</p> <p>15 defects that are fully responsive.</p> <p>16 Q. Okay. And I asked you about</p> <p>17 autism.</p> <p>18 A. Right.</p> <p>19 Q. Autism is not neural tube</p> <p>20 defects, correct?</p> <p>21 A. And then the -- on the</p> <p>22 follow-up for that, we were also funded to</p> <p>23 look at the neurological impacts because</p> <p>24 these are also associated with neurological</p> <p>25 problems in people -- both adults taking the</p>	<p style="text-align: right;">Page 37</p> <p>1 studying autism.</p> <p>2 Q. Okay. And it wasn't</p> <p>3 specifically autism that you were studying.</p> <p>4 Even in the last three years, it was</p> <p>5 neurological effects of that compound,</p> <p>6 correct?</p> <p>7 A. That is correct.</p> <p>8 Q. That includes more than autism,</p> <p>9 right?</p> <p>10 A. Yes.</p> <p>11 Q. What else does it include?</p> <p>12 A. Well, in human patients, it's</p> <p>13 predominantly what's referred to as adverse</p> <p>14 events. And so adverse events reported</p> <p>15 included things like headache in patients,</p> <p>16 potentially, and other, I guess, complaints</p> <p>17 that were neurological in people that were</p> <p>18 taking the medication.</p> <p>19 Q. And has this research been</p> <p>20 published?</p> <p>21 A. The neural tube defects paper</p> <p>22 was just published, I believe, a couple weeks</p> <p>23 ago.</p> <p>24 Q. Uh-huh.</p> <p>25 A. And the behavioral studies we</p>

<p style="text-align: right;">Page 38</p> <p>1 haven't published yet.</p> <p>2 Q. Are you intending to?</p> <p>3 A. Yes, we do.</p> <p>4 Q. Okay. What, if any,</p> <p>5 conclusions did you come to as to what you're</p> <p>6 calling behavioral effects of that compound?</p> <p>7 A. So we've seen increased</p> <p>8 activity in those animals that we documented</p> <p>9 in open field testing.</p> <p>10 Q. And what does that increased</p> <p>11 activity mean to you?</p> <p>12 A. Well, there's different</p> <p>13 interpretations, but potentially anxiety in</p> <p>14 the animals.</p> <p>15 Q. Okay. And does the anxiety</p> <p>16 allow you to opine that that compound causes</p> <p>17 any particular neurologic effect or defect?</p> <p>18 A. Yeah. So we follow that up</p> <p>19 with looking at the brain and doing brain</p> <p>20 pathology, and also metabolomics on the brain</p> <p>21 as well.</p> <p>22 Q. Okay. So you sacrifice the</p> <p>23 animal and examine the mouse brain?</p> <p>24 A. Yes.</p> <p>25 Q. Okay. And what conclusions, if</p>	<p style="text-align: right;">Page 40</p> <p>1 might change your conclusion? Is that what</p> <p>2 you're saying?</p> <p>3 A. Yes.</p> <p>4 Q. Okay. So if we went and looked</p> <p>5 at the grant that you got that you're talking</p> <p>6 about for this compound, would it say that</p> <p>7 you were investigating autism?</p> <p>8 A. It does not.</p> <p>9 Q. Okay. Would it say that you're</p> <p>10 investigating ADHD?</p> <p>11 A. It would not.</p> <p>12 Q. Okay. So is this work that</p> <p>13 you're doing here, this is the first time you</p> <p>14 actually examined specifically autism and</p> <p>15 ADHD in relation to any particular</p> <p>16 environmental exposure.</p> <p>17 Is that fair?</p> <p>18 A. That is not correct.</p> <p>19 Q. Okay. What else have you --</p> <p>20 what other work have you done evaluating</p> <p>21 autism and ADHD as an outcome to an exposure?</p> <p>22 A. When I was in graduate school,</p> <p>23 we also did a behavioral study looking at the</p> <p>24 exposure of valproic acid and heavy metals in</p> <p>25 autism core behaviors.</p>
<p style="text-align: right;">Page 39</p> <p>1 any, did you draw between that compound and</p> <p>2 causation as to any particular neurologic</p> <p>3 effect?</p> <p>4 A. Suffice it to say, we do see</p> <p>5 changes in single carb metabolism that</p> <p>6 appears to be affecting dopaminergic</p> <p>7 pathways, but we haven't drawn any</p> <p>8 conclusions other than the fact that there --</p> <p>9 the animal has increased anxiety at this</p> <p>10 point.</p> <p>11 Q. Okay. So increased anxiety in</p> <p>12 a mouse model doesn't necessarily mean that</p> <p>13 it causes any particular neurologic defect?</p> <p>14 A. It can be consistent with other</p> <p>15 problems, but we haven't seen other problems</p> <p>16 in the animal. That was one of the things</p> <p>17 that we noted that was statistically</p> <p>18 significant in the study that we did.</p> <p>19 Q. And what other problems would</p> <p>20 you look for?</p> <p>21 A. So some of the things that can</p> <p>22 be looked for is we also do three-chamber for</p> <p>23 socialization. We didn't see changes in</p> <p>24 socialization in that animal.</p> <p>25 Q. Okay. And if you had, then it</p>	<p style="text-align: right;">Page 41</p> <p>1 Q. Okay. And that -- was that in</p> <p>2 a particular lab in grad school?</p> <p>3 A. Yes, it was.</p> <p>4 Q. And is it the same lab you work</p> <p>5 in now?</p> <p>6 A. Well, we've come a long ways,</p> <p>7 but, yes, I still work for the same person.</p> <p>8 Q. Okay. So in grad school, was</p> <p>9 that Richard Finnell's lab?</p> <p>10 A. Yeah, he was the director of</p> <p>11 the institute and also the PI of the lab.</p> <p>12 Q. And he was looking at Depakote,</p> <p>13 or valproic acid, and neurologic outcomes?</p> <p>14 A. Not exactly. A colleague of</p> <p>15 mine, Denise Hill, was interested in heavy</p> <p>16 metal toxicity, and we appreciated that</p> <p>17 valproic acid was the model for autism in</p> <p>18 animal models, particularly in mice. And so</p> <p>19 we compared heavy metal exposure with</p> <p>20 valproic acid in those animal models.</p> <p>21 Q. To what endpoint? To see if</p> <p>22 the heavy metal exposure could induce autism?</p> <p>23 A. Autism-like behaviors, yes.</p> <p>24 Q. Okay. And was that published?</p> <p>25 A. Yes, it was.</p>

<p style="text-align: right;">Page 42</p> <p>1 Q. Okay. And had you ever done</p> <p>2 neural tube defect research on valproic acid</p> <p>3 before that?</p> <p>4 A. Yes.</p> <p>5 Q. Was that also in your grad</p> <p>6 school research?</p> <p>7 A. Yes, it was.</p> <p>8 Q. Okay. So your role, when you</p> <p>9 were in grad school, I take it, you weren't a</p> <p>10 lead investigator or anything like that on</p> <p>11 that study?</p> <p>12 A. In graduate school, I was --</p> <p>13 well, one of those studies I was first author</p> <p>14 but not the PI of the study.</p> <p>15 Q. Okay. How about the autism and</p> <p>16 valproic acid study, were you first author</p> <p>17 there?</p> <p>18 A. I was -- Denise was the -- that</p> <p>19 was her first author publication. I</p> <p>20 followed, second author.</p> <p>21 Q. And on that publication, if we</p> <p>22 looked at it, was that in an animal model, or</p> <p>23 were you making determinations as to human</p> <p>24 effects?</p> <p>25 A. That was in an animal model.</p>	<p style="text-align: right;">Page 44</p> <p>1 treatments, like valproic acid and</p> <p>2 phenobarbital, those are known teratogens,</p> <p>3 correct?</p> <p>4 A. Particularly valproic acid</p> <p>5 is -- they're potent teratogens.</p> <p>6 Q. By the time you were in grad</p> <p>7 school, everybody agreed and knew that</p> <p>8 first-line AEDs could induce major congenital</p> <p>9 malformations in human beings, correct?</p> <p>10 A. I would like to think that</p> <p>11 everyone knew, but there were still people</p> <p>12 defending the position that they didn't. I</p> <p>13 still argue incorrectly, but it was generally</p> <p>14 understood that they were -- caused birth</p> <p>15 defects.</p> <p>16 Q. Well -- and that's one of the</p> <p>17 reasons that you used it in the mouse model,</p> <p>18 correct?</p> <p>19 A. That's correct.</p> <p>20 Q. All right. And one of the</p> <p>21 reasons that you knew that is because there</p> <p>22 had been prospective, double-blind pregnancy</p> <p>23 registries that showed a profound effect of</p> <p>24 valproic acid on human pregnancy, correct?</p> <p>25 A. Well, there had been initially</p>
<p style="text-align: right;">Page 43</p> <p>1 Q. Okay. So let me try again</p> <p>2 then.</p> <p>3 Is this the first time you've</p> <p>4 ever opined that a compound -- an exposure</p> <p>5 can cause -- can induce autism in a human</p> <p>6 being?</p> <p>7 A. Yes, it is.</p> <p>8 Q. Okay. And you've never done</p> <p>9 that or made that conclusion outside of</p> <p>10 litigation ever before today in this year,</p> <p>11 correct?</p> <p>12 A. Yeah, this is my first time</p> <p>13 offering an opinion on autism.</p> <p>14 Q. Okay.</p> <p>15 A. Or ADHD.</p> <p>16 Q. Back to valproic acid.</p> <p>17 Valproic acid has been known to</p> <p>18 be a human teratogen for decades, correct?</p> <p>19 A. That is correct.</p> <p>20 Q. It was one of the early</p> <p>21 antiepileptic drugs, the first -- first-line</p> <p>22 antiepileptic drug a long time ago, correct?</p> <p>23 A. Discovered by chance, it was</p> <p>24 shown to be an effective antiepileptic drug.</p> <p>25 Q. And those first-line</p>	<p style="text-align: right;">Page 45</p> <p>1 retrospective studies that had identified</p> <p>2 there was an effect of valproic acid, and</p> <p>3 then those were followed up by both animal</p> <p>4 models that demonstrated that, in addition to</p> <p>5 prospective studies in women with epilepsy</p> <p>6 treated and untreated.</p> <p>7 Q. Okay. Are you familiar with</p> <p>8 the North American Antiepileptic Drug</p> <p>9 Registry?</p> <p>10 A. I am.</p> <p>11 Q. Do you know Lew Holmes?</p> <p>12 A. I do.</p> <p>13 Q. Sonia Hernandez-Diaz?</p> <p>14 A. I've met her a couple of times.</p> <p>15 Q. Okay. So you know -- you know</p> <p>16 how they conducted that registry, right?</p> <p>17 A. Not at its inception, but I'm</p> <p>18 familiar with the work.</p> <p>19 Q. You're familiar that it's a</p> <p>20 human exposure registry?</p> <p>21 A. Ongoing.</p> <p>22 Q. Ongoing.</p> <p>23 In human pregnancies, right?</p> <p>24 A. That's correct.</p> <p>25 Q. With exposure to anti- --</p>

<p>Page 46</p> <p>1 unknown, blinded antiepileptic drugs, 2 correct?</p> <p>3 A. A variety of them now, yes.</p> <p>4 Q. And it's prospective. They're 5 followed -- they're enrolled right at the 6 beginning of pregnancy, right?</p> <p>7 A. That's correct.</p> <p>8 Q. Okay. And the Holmes and 9 Hernandez-Diaz are blind to the patient and 10 the drugs, right?</p> <p>11 A. That is my understanding until 12 the analysis is done.</p> <p>13 Q. And it's double-blind, right?</p> <p>14 A. I -- I'm not sure about the 15 double-blinding. I'd have to check that 16 particular publication you're referring to.</p> <p>17 Q. Okay. Well, there's many 18 publications, right?</p> <p>19 A. Yes.</p> <p>20 Q. The pregnancy registry, they 21 constantly publish any time something becomes 22 significant, right?</p> <p>23 A. They publish updates regularly.</p> <p>24 Q. Right.</p> <p>25 And that level of evidence</p>	<p>Page 48</p> <p>1 animal evidence is what matters?</p> <p>2 A. Well, I disagree because I talk 3 to physicians regularly that counsel women 4 that take anticonvulsant drugs, and they 5 quite often ask me what I see in the animal 6 models to help inform them on the relative 7 risk of medications that they use that don't 8 have enough data on them.</p> <p>9 Q. Are you talking about the 10 third-line antiepileptics?</p> <p>11 A. Well, looking at particularly 12 the newer ones, yes.</p> <p>13 Q. Well, you know -- you know 14 there isn't registry data on those yet, 15 right, because they haven't reached 16 significance?</p> <p>17 A. Well, yes, because there's not 18 enough exposures in the database yet.</p> <p>19 Q. Right. Right.</p> <p>20 So I don't think we're 21 understanding each other because I'm asking 22 you about drugs when we have human data, and 23 we do have a publication because it did 24 become significant in the registry.</p> <p>25 Okay?</p>
<p>Page 47</p> <p>1 is -- would you agree it's about as good as 2 you get in human pregnancy?</p> <p>3 A. The combination of having an 4 animal model, having first observed this 5 prospectively -- or excuse me, 6 retrospectively and then doing the 7 prospective study, that's -- that is strong 8 evidence.</p> <p>9 Q. Okay. Well, I didn't ask you 10 about the animal model.</p> <p>11 A. Yeah.</p> <p>12 Q. What matters to people now, we 13 have double-blind, prospective pregnancy 14 registry human evidence now today, correct?</p> <p>15 A. That is -- we do.</p> <p>16 Q. And if you ask anybody in the 17 field what the best evidence is, they're not 18 going to start talking about animal studies. 19 They're going to talk about the 20 North American Antiepileptic Drug Pregnancy 21 Registry and the publications that came out 22 of that, correct?</p> <p>23 A. I disagree.</p> <p>24 Q. Okay. You disagree because you 25 think now that we have human evidence, the</p>	<p>Page 49</p> <p>1 For those drugs, not the newer 2 ones, for those drugs, nobody is talking 3 about the animal data. They're talking about 4 the actual human data that became significant 5 in a prospective, double-blind pregnancy 6 registry, correct?</p> <p>7 A. That's largely what you will 8 hear about as far as -- for clinical 9 analysis.</p> <p>10 Q. That's the highest level of 11 evidence you can get in human pregnancy 12 within the bounds of current ethics, correct?</p> <p>13 A. Well, in addition to that, that 14 can be distilled further into meta-analysis. 15 That would be the best set of data.</p> <p>16 Q. If there's multiple studies.</p> <p>17 A. If there's multiple studies.</p> <p>18 Q. Okay. All right. And valproic 19 acid has had a major congenital malformation 20 warning on the label, as the drug Depakote, 21 for decades, correct?</p> <p>22 A. As far as I know, yes.</p> <p>23 Q. Okay. And then eventually, 24 after it was already, essentially, not used 25 in pregnancy unless no other AED would work,</p>

<p style="text-align: right;">Page 50</p> <p>1 an autism warning was added to it, correct?</p> <p>2 A. That is correct.</p> <p>3 Q. Okay. Throughout your reports</p> <p>4 you mentioned many times an adverse outcome</p> <p>5 pathway.</p> <p>6 A. (Witness nods head.)</p> <p>7 Q. In particular, an AOP 20. Do</p> <p>8 you remember including that in all of your</p> <p>9 reports --</p> <p>10 A. Yes, I do.</p> <p>11 Q. -- or at least your original</p> <p>12 report, your amended report and your</p> <p>13 supplemental -- your rebuttal report all have</p> <p>14 AOP 20, correct?</p> <p>15 A. That is correct.</p> <p>16 Q. Okay. And what organization</p> <p>17 came up with that pathway?</p> <p>18 A. Well, that was published by the</p> <p>19 OECD, is -- it's where I found that</p> <p>20 originally.</p> <p>21 Q. Okay. And what is the basis</p> <p>22 behind OECD? How do you know about them, and</p> <p>23 how do you use them in your regular work?</p> <p>24 A. So the AOPs themselves I'm</p> <p>25 familiar with because I've done some work</p>	<p style="text-align: right;">Page 52</p> <p>1 You don't know if FDA uses</p> <p>2 AOPs, do you?</p> <p>3 A. I'm not familiar with them</p> <p>4 using AOPs.</p> <p>5 Q. You've never seen them using an</p> <p>6 AOP, correct?</p> <p>7 A. Like I said, I'm not familiar</p> <p>8 with their use --</p> <p>9 Q. By --</p> <p>10 A. -- by the FDA.</p> <p>11 Q. By the way, have you ever been</p> <p>12 contacted by the FDA for assistance with</p> <p>13 regard to any particular compound?</p> <p>14 A. Yes, I have.</p> <p>15 Q. Okay. And is it the one that</p> <p>16 you were -- that you were talking about</p> <p>17 earlier that you're working on now?</p> <p>18 A. Well, with the entire class of</p> <p>19 molecules, the HIV integrase inhibitors, I</p> <p>20 was asked to go with the -- with the FDA,</p> <p>21 with the World Health Organization at the</p> <p>22 National Institutes of Health and National</p> <p>23 Institutes of Child Health and Development</p> <p>24 and present the work I had done on that</p> <p>25 compound.</p>
<p style="text-align: right;">Page 51</p> <p>1 with the EPA in the past, and it's common for</p> <p>2 us to put AOPs together; to look for the</p> <p>3 existing evidence on a particular molecular</p> <p>4 interaction and whether it can have an impact</p> <p>5 on an organism; and how it has an impact on</p> <p>6 the organisms and whether there's any gaps in</p> <p>7 the data on having that impact on an</p> <p>8 organism.</p> <p>9 Q. Okay. And the AOP 20 that you</p> <p>10 refer to a lot, you didn't publish that or</p> <p>11 put that together, correct?</p> <p>12 A. I did not. That was</p> <p>13 independently done by researchers I -- I'm</p> <p>14 unfamiliar with before I had seen the AOP.</p> <p>15 Q. Okay. And did you see that AOP</p> <p>16 for the first time in connection with this</p> <p>17 litigation?</p> <p>18 A. Yes. It was published, I</p> <p>19 think, while I was doing the review of the</p> <p>20 literature for this litigation.</p> <p>21 Q. Okay. And you mentioned EPA.</p> <p>22 You mean the Environmental Protective</p> <p>23 Association?</p> <p>24 A. Agency, yes.</p> <p>25 Q. Agency. Agency.</p>	<p style="text-align: right;">Page 53</p> <p>1 Q. Okay. And that was a -- some</p> <p>2 sort of meeting?</p> <p>3 A. It was a meeting, yes, a</p> <p>4 conference.</p> <p>5 Q. And when was that?</p> <p>6 A. I believe it's approximately</p> <p>7 six years ago now. I think I have it on my</p> <p>8 résumé for a conference I attended.</p> <p>9 Q. Okay. So that was the neural</p> <p>10 tube defect work that was funded by the</p> <p>11 National Institutes of Health?</p> <p>12 A. It ultimately led to the</p> <p>13 funding of that work, yes.</p> <p>14 Q. Led to the funding of the work.</p> <p>15 And then at some point you presented at a</p> <p>16 conference, and were you presenting on behalf</p> <p>17 of FDA?</p> <p>18 A. No. I was meeting with -- it</p> <p>19 was a conference with shareholders in the</p> <p>20 medications, different shareholders for each</p> <p>21 one of the HIV antiviral integrase</p> <p>22 inhibitors, and we met with them in addition</p> <p>23 to the FDA and the World Health Organization.</p> <p>24 Q. Okay. So who asked you to</p> <p>25 attend that meeting?</p>

<p style="text-align: right;">Page 54</p> <p>1 A. The NIH.</p> <p>2 Q. Okay. So not the FDA?</p> <p>3 A. Well, the NIH would -- who had</p> <p>4 contacted us. The FDA was there also.</p> <p>5 Q. Right. I understand they were</p> <p>6 there.</p> <p>7 My original question was</p> <p>8 whether the FDA ever asked you to do any work</p> <p>9 in particular on a compound.</p> <p>10 A. Right.</p> <p>11 Q. And FDA has not asked you to do</p> <p>12 work on a compound, correct?</p> <p>13 A. Well, multiple organizations</p> <p>14 that were -- that were asking for that.</p> <p>15 Q. Let me try this again. FDA</p> <p>16 didn't invite you to that conference,</p> <p>17 correct?</p> <p>18 A. It's hosted by the NIH.</p> <p>19 Q. Okay. Did you have any contact</p> <p>20 with the FDA other than talking to them at</p> <p>21 that meeting?</p> <p>22 A. Yes, I did.</p> <p>23 Q. Okay. What was that?</p> <p>24 A. Other people at the -- at the</p> <p>25 FDA had contacted me, and I had some</p>	<p style="text-align: right;">Page 56</p> <p>1 published by -- not an OECD publication but</p> <p>2 an independently published.</p> <p>3 Q. Okay. And the reason I'm</p> <p>4 asking about AOP 20, you mentioned your heavy</p> <p>5 metal research just a little bit ago.</p> <p>6 AOP 20 is about using mercury</p> <p>7 to induce neurologic effects, correct?</p> <p>8 A. The primary compound that is</p> <p>9 described in that AOP is mercury, but it also</p> <p>10 includes acetaminophen as a common compound</p> <p>11 that can also produce the same oxidative</p> <p>12 damage in -- in cells and produce the same</p> <p>13 outcomes.</p> <p>14 Q. Well, the pathway itself has</p> <p>15 multiple steps, correct?</p> <p>16 A. That's correct.</p> <p>17 Q. And the one that's published</p> <p>18 that you're relying on uses mercury to induce</p> <p>19 the depletion of glutathione, right?</p> <p>20 A. Well, they specifically look at</p> <p>21 mercury and the depletion of glutathione, in</p> <p>22 addition to the AOP cascade. And the</p> <p>23 analysis they conduct is then a weight of the</p> <p>24 evidence analysis on that AOP, specific to</p> <p>25 mercury.</p>
<p style="text-align: right;">Page 55</p> <p>1 correspondence with them about the work we</p> <p>2 were doing.</p> <p>3 Q. Okay. Before or after the</p> <p>4 meeting?</p> <p>5 A. Both.</p> <p>6 Q. Okay. And it was in regards to</p> <p>7 those compounds --</p> <p>8 A. Yes.</p> <p>9 Q. -- correct?</p> <p>10 Did they ever -- ever ask you</p> <p>11 for -- to provide them a report or any</p> <p>12 specific research?</p> <p>13 A. They did ask for the data that</p> <p>14 we were -- that we planned on presenting.</p> <p>15 Q. And this was all with regard to</p> <p>16 neural tube defects, correct?</p> <p>17 A. Yes, it was.</p> <p>18 Q. Okay. Back to the -- to the</p> <p>19 AOP.</p> <p>20 Is AOP 20 the only AOP that is</p> <p>21 important to your opinions here?</p> <p>22 A. Well, in addition, there was</p> <p>23 also another publication that came out in</p> <p>24 regards to the cannabinoid pathway, which was</p> <p>25 also another adverse outcome pathway that was</p>	<p style="text-align: right;">Page 57</p> <p>1 But they include acetaminophen</p> <p>2 as another compound that can produce the same</p> <p>3 effects as far as the oxidative damage and</p> <p>4 the interaction with thiol groups and</p> <p>5 specifically with glutathione.</p> <p>6 Q. They do not, Dr. Cabrera,</p> <p>7 include acetaminophen as something that can</p> <p>8 be the first step to deplete the glutathione</p> <p>9 in that AOP, correct?</p> <p>10 A. It's not in the group of</p> <p>11 compounds like mercury. It's not -- it's not</p> <p>12 listed with mercury.</p> <p>13 Q. Right.</p> <p>14 So the only place that -- if we</p> <p>15 look at it, and we probably will later today,</p> <p>16 the only place we would see acetaminophen is</p> <p>17 in a list -- in that pathway on the third</p> <p>18 step, I believe. It's in a list of stressors</p> <p>19 that once the glutathione is gone because of</p> <p>20 the mercury can induce damage in the pathway,</p> <p>21 correct?</p> <p>22 A. That's not correct. It's a</p> <p>23 list of stressors that can produce the same</p> <p>24 biological effect, molecular and biological</p> <p>25 effect.</p>

<p style="text-align: right;">Page 58</p> <p>1 Q. Okay.</p> <p>2 A. And that is oxidative stress.</p> <p>3 Q. Do you agree that step one only</p> <p>4 includes mercury and that step one is to</p> <p>5 deplete the glutathione so that there's no</p> <p>6 glutathione in the system, correct?</p> <p>7 A. Well, there are other compounds</p> <p>8 listed in addition to mercury that can</p> <p>9 produce those effects.</p> <p>10 Q. Okay. And the other compounds</p> <p>11 are other heavy metals that are not</p> <p>12 acetaminophen, correct?</p> <p>13 A. They're not just heavy metals.</p> <p>14 Q. Okay. They're not</p> <p>15 acetaminophen in the other compounds that can</p> <p>16 deplete the glutathione, correct?</p> <p>17 A. Well, acetaminophen can deplete</p> <p>18 glutathione, but it's not specifically listed</p> <p>19 in the AOP with mercury. It's listed as a</p> <p>20 stressor in that pathway.</p> <p>21 Q. Let me -- let me -- let me</p> <p>22 clarify that question because I think -- I</p> <p>23 think we're on the same page.</p> <p>24 In the AOP 20, which you rely</p> <p>25 on in your report, acetaminophen is not part</p>	<p style="text-align: right;">Page 60</p> <p>1 underlying -- you saw there were references</p> <p>2 for the list of stressors, correct?</p> <p>3 A. Yes.</p> <p>4 Q. Did you look at the underlying</p> <p>5 papers?</p> <p>6 A. Yes, I did.</p> <p>7 Q. Okay. And did you see the data</p> <p>8 for why acetaminophen is in there?</p> <p>9 A. Why -- I'm familiar with the</p> <p>10 data, yes.</p> <p>11 Q. Well, in the published -- in</p> <p>12 the literature references, there's nothing</p> <p>13 behind it, right? It's just acetaminophen is</p> <p>14 in a list of things that can cause --</p> <p>15 potentially cause damage in the setting of</p> <p>16 depleted glutathione?</p> <p>17 A. Well, acetaminophen itself can</p> <p>18 cause decreases in glutathione.</p> <p>19 Q. I know you believe that, but</p> <p>20 that's not in the AOP, correct?</p> <p>21 A. That's not a belief. That's</p> <p>22 supported by factual, scientific data.</p> <p>23 Q. Well, it's -- Dr. Cabrera, it's</p> <p>24 not in AOP 20, is it?</p> <p>25 A. It does deplete glutathione in</p>
<p style="text-align: right;">Page 59</p> <p>1 of step one of depleting the glutathione.</p> <p>2 That is not listed as one of the things it</p> <p>3 can, correct?</p> <p>4 A. So, in the AOP, it's not listed</p> <p>5 with mercury in those first set of compounds.</p> <p>6 Q. And then the next step or</p> <p>7 further down the cascade -- you used the term</p> <p>8 cascade, right? It's the pathway?</p> <p>9 A. Yes.</p> <p>10 Q. There's -- once the glutathione</p> <p>11 is depleted, there's the stressors, and</p> <p>12 there's a list of them, correct?</p> <p>13 A. Generally speaking, the effect</p> <p>14 of glutathione can be made worse or can be</p> <p>15 caused by the stressors as well.</p> <p>16 Q. And does it say that in the</p> <p>17 AOP?</p> <p>18 A. It describes the effect of the</p> <p>19 stressors as creating oxidative damage, which</p> <p>20 is consistent with the same effect that the</p> <p>21 mercury and other compounds cause.</p> <p>22 Q. But it doesn't say it in the</p> <p>23 AOP, correct?</p> <p>24 A. It says exactly what I said.</p> <p>25 Q. Okay. Did you look at the</p>	<p style="text-align: right;">Page 61</p> <p>1 AOP 20. It can cause depletion of</p> <p>2 glutathione.</p> <p>3 Q. Okay. Okay. We're going to</p> <p>4 have to look at that because that's...</p> <p>5 So your testimony right now is</p> <p>6 that AOP 20 says that acetaminophen depletes</p> <p>7 glutathione?</p> <p>8 A. Not absolutely, but it --</p> <p>9 certainly as a stressor, it can decrease</p> <p>10 glutathione.</p> <p>11 Q. And you're saying that AOP 20</p> <p>12 says that?</p> <p>13 A. That as a stressor</p> <p>14 acetaminophen can decrease glutathione.</p> <p>15 Q. Okay. Did you look into the</p> <p>16 other stressors that are listed in AOP 20 --</p> <p>17 A. Yes, I did.</p> <p>18 Q. -- do you recall them?</p> <p>19 Okay. So furan, you saw that?</p> <p>20 A. Furan, yes.</p> <p>21 Q. Did you look at the literature</p> <p>22 behind that?</p> <p>23 A. I'm familiar with it.</p> <p>24 Q. Did you look at the references</p> <p>25 that are actually in AOP 20?</p>

<p>Page 62</p> <p>1 A. Some of them.</p> <p>2 Q. Okay. Do you know why not</p> <p>3 every -- not all the stressors that were</p> <p>4 listed in the reference literature were</p> <p>5 included in AOP 20?</p> <p>6 A. Well, because they only did a</p> <p>7 weight of the evidence analysis on mercury.</p> <p>8 Q. How do you know that?</p> <p>9 A. It's evident in the document.</p> <p>10 Q. So carbon tetrachloride isn't a</p> <p>11 stressor in the setting of mercury.</p> <p>12 Is that your testimony?</p> <p>13 A. It's -- it's listed in the AOP,</p> <p>14 but the AOP is specific in regards to a</p> <p>15 weight of an evidence analysis for mercury.</p> <p>16 Q. Carbon tetrachloride is listed</p> <p>17 in the AOP?</p> <p>18 A. We should -- we should look at</p> <p>19 the AOP for specific compounds. I don't</p> <p>20 remember them all.</p> <p>21 Q. Okay. And the outcome --</p> <p>22 because it's an adverse outcome pathway, the</p> <p>23 outcome is what in AOP 20?</p> <p>24 A. Again, we should look at the</p> <p>25 document if you want a specific -- the</p>	<p>Page 64</p> <p>1 also affect glutathione as part of its</p> <p>2 metabolism, just like mercury.</p> <p>3 (Cabrera Exhibit 1 marked for</p> <p>4 identification.)</p> <p>5 QUESTIONS BY MR. MURDICA:</p> <p>6 Q. Why don't we mark that, the</p> <p>7 AOP 20.</p> <p>8 Okay. Is that the AOP that you</p> <p>9 have in front of you, Doctor?</p> <p>10 A. Yes, it is.</p> <p>11 MR. WATTS: Jim, what is the</p> <p>12 exhibit number?</p> <p>13 MR. MURDICA: It is AOP 20</p> <p>14 that's cited in this --</p> <p>15 MS. KING: It's 1.</p> <p>16 MR. MURDICA: Exhibit 1, yeah.</p> <p>17 MR. WATTS: There you go.</p> <p>18 MR. MURDICA: We didn't mark</p> <p>19 anything yet.</p> <p>20 QUESTIONS BY MR. MURDICA:</p> <p>21 Q. And, Dr. Cabrera, prior to this</p> <p>22 being -- well, is this -- is this published</p> <p>23 in peer-reviewed literature?</p> <p>24 A. Yes, I believe it is.</p> <p>25 Q. Okay. And where is it?</p>
<p>Page 63</p> <p>1 specific language, but in regards to learning</p> <p>2 and development.</p> <p>3 Q. Right.</p> <p>4 In learning and development,</p> <p>5 you're using that as a marker for autism in</p> <p>6 your report, correct?</p> <p>7 A. It's described in the document</p> <p>8 itself, that it can overlap with autism.</p> <p>9 Q. Okay. Your testimony is AOP 20</p> <p>10 describes in the document that learning --</p> <p>11 decreased learning can overlap with autism?</p> <p>12 A. That's correct. I quoted</p> <p>13 that -- those specific statements in my</p> <p>14 report.</p> <p>15 Q. And you are relying on AOP 20</p> <p>16 as proof that a pathway exists between --</p> <p>17 well, it only has mercury in there, but a, I</p> <p>18 guess, demonstrative that such a pathway</p> <p>19 could exist between an exposure and autism,</p> <p>20 correct?</p> <p>21 A. It doesn't only have mercury in</p> <p>22 there. It has other compounds, and one of</p> <p>23 those stressors includes acetaminophen</p> <p>24 interacting with the same pathway.</p> <p>25 And as I'm well aware, it can</p>	<p>Page 65</p> <p>1 A. I -- I'd have to look.</p> <p>2 Q. Okay. You found this online,</p> <p>3 though, right?</p> <p>4 A. It is correct.</p> <p>5 Q. Not in any particular</p> <p>6 literature citation or anything like that?</p> <p>7 A. Initially I found it online --</p> <p>8 Q. Okay.</p> <p>9 A. -- when I was searching the</p> <p>10 database for adverse outcome pathways.</p> <p>11 Q. Okay. And have you ever been a</p> <p>12 part of the review for this adverse outcome</p> <p>13 pathway?</p> <p>14 A. I was not part of the review</p> <p>15 for this adverse outcome pathway.</p> <p>16 MS. KING: Do you have another</p> <p>17 copy? Is that going to be the case</p> <p>18 with all of the exhibits? Because I'm</p> <p>19 going to want a copy so I can look at</p> <p>20 it all along.</p> <p>21 Depending on how we go, I might</p> <p>22 need to ask for a break and get a copy</p> <p>23 made.</p> <p>24 MR. MURDICA: You know what,</p> <p>25 we'll --</p>

<p style="text-align: right;">Page 66</p> <p>1 MS. KING: Go ahead.</p> <p>2 MR. MURDICA: We'll come back</p> <p>3 to it, that way you have -- you have</p> <p>4 your own copy --</p> <p>5 MS. KING: Thank you.</p> <p>6 MR. MURDICA: -- when we do.</p> <p>7 QUESTIONS BY MR. MURDICA:</p> <p>8 Q. Let's go back to genetics.</p> <p>9 We'll come back to this later.</p> <p>10 In your -- in your practice, do</p> <p>11 you treat any human patients?</p> <p>12 A. Treat, we do not -- I do not</p> <p>13 treat patients.</p> <p>14 Q. Okay. You do not diagnose</p> <p>15 patients, correct?</p> <p>16 A. I do genetic analysis</p> <p>17 consistent with identifying mutations in</p> <p>18 human patients, but I'm not allowed to</p> <p>19 diagnose patients.</p> <p>20 Q. And that's -- is that because</p> <p>21 you're not a medical doctor?</p> <p>22 A. It's because I'm not a licensed</p> <p>23 geneticist or medical doctor or medical</p> <p>24 geneticist.</p> <p>25 Q. In your rebuttal report, you</p>	<p style="text-align: right;">Page 68</p> <p>1 normal work outside of litigation?</p> <p>2 A. If it's in regards to</p> <p>3 teratogens that can have a detrimental effect</p> <p>4 on people, I reckon everyone's entitled to a</p> <p>5 defense in our -- in our country, but</p> <p>6 nevertheless, those compounds are</p> <p>7 particularly dangerous.</p> <p>8 Q. Right.</p> <p>9 And what Dr. Chung was talking</p> <p>10 about was whether or not they induce autism,</p> <p>11 not whether or not they're dangerous or</p> <p>12 induce major congenital malformations,</p> <p>13 correct?</p> <p>14 A. Compounds that can cause</p> <p>15 congenital malformations and autism are</p> <p>16 dangerous compounds.</p> <p>17 Q. Yeah, and that's not -- that's</p> <p>18 not what I was asking.</p> <p>19 You realize the portion of</p> <p>20 Dr. Chung's opinion that you were criticizing</p> <p>21 was about whether those compounds cause</p> <p>22 autism and other effects, not whether they</p> <p>23 cause major congenital malformations,</p> <p>24 correct?</p> <p>25 A. Well, as autism is represented</p>
<p style="text-align: right;">Page 67</p> <p>1 reference Dr. Chung many times.</p> <p>2 Do you know Dr. Chung?</p> <p>3 A. Not personally.</p> <p>4 Q. Okay. Have you ever interacted</p> <p>5 with Dr. Chung in any way?</p> <p>6 A. Not personally.</p> <p>7 Q. Okay. Is there any reason why</p> <p>8 you would like or dislike Dr. Chung</p> <p>9 personally?</p> <p>10 A. No.</p> <p>11 Q. When you compared Dr. Chung to</p> <p>12 defending war criminals, that wasn't from any</p> <p>13 personal opinion?</p> <p>14 MR. TRACEY: Object to the</p> <p>15 form.</p> <p>16 THE WITNESS: I was referring</p> <p>17 to the drugs as -- and the fact that</p> <p>18 they were human teratogens, that they</p> <p>19 were similar to war criminals in the</p> <p>20 fact that they had maimed and hurt</p> <p>21 people, the chemicals.</p> <p>22 QUESTIONS BY MR. MURDICA:</p> <p>23 Q. Is that -- is accusing people</p> <p>24 of defending war criminals something that</p> <p>25 you -- is that the way you talk in your</p>	<p style="text-align: right;">Page 69</p> <p>1 as a functional deficit that is correlated</p> <p>2 with congenital malformations, specifically</p> <p>3 like neural tube defects, those are similar</p> <p>4 in that regard.</p> <p>5 Q. Is autism a structural birth</p> <p>6 defect?</p> <p>7 A. That's -- it's diagnosed by</p> <p>8 behavioral testing clinically.</p> <p>9 Q. Right.</p> <p>10 So it's not diagnosed as a</p> <p>11 structural birth defect, correct?</p> <p>12 A. There are structural defects</p> <p>13 associated with it, but it's not part of its</p> <p>14 diagnosis.</p> <p>15 Q. Okay. And not every -- not</p> <p>16 every compound that induces structural birth</p> <p>17 defects also induce autism, correct?</p> <p>18 A. That is correct.</p> <p>19 Q. Okay. In fact, of the -- of</p> <p>20 the antiepileptic drugs -- of which you</p> <p>21 believe many cause major congenital</p> <p>22 malformations, correct?</p> <p>23 A. That's correct.</p> <p>24 Q. Only one has been associated</p> <p>25 with autism to date, correct?</p>

<p style="text-align: right;">Page 70</p> <p>1 A. We're currently conducting 2 those studies in animal models, but in the -- 3 as far as the handbook for physicians, it was 4 specific to valproic acid. 5 Q. Okay. Are there other 6 antiepileptics that you believe cause autism? 7 A. We're currently looking at 8 that. 9 Q. Okay. Are there any that you 10 believe so far cause autism? 11 A. We're still blinded to that 12 data, and I'm not ready to draw conclusions 13 on it. 14 Q. Okay. And when you say "we," 15 you're doing more animal studies on 16 antiepileptics? 17 A. Yes, we are. 18 Q. Which antiepileptics are 19 included in your studies? 20 A. Well, valproic acid, in 21 addition to -- and I don't have them all in 22 front of me, but there's several other 23 compounds that we're testing that are also 24 anticonvulsant drugs. 25 Q. Okay. But you can't think of</p>	<p style="text-align: right;">Page 72</p> <p>1 time right now? 2 A. Yes. 3 Q. Understanding that you -- I 4 think you said you can't -- even though you 5 can conduct genetic testing, you can't 6 diagnose anyone; is that right? You can't 7 diagnose a human patient? 8 A. Yes. So we run human patients 9 for what's referred to as sequencing or 10 resequencing. We also can send out for whole 11 genome, and I do the analysis of that, but I 12 provide the reports back to whomever is the 13 intended physician or the medical geneticist 14 for diagnosis. 15 Q. Okay. And I assume you've 16 never diagnosed anyone with autism or ADHD. 17 Is that fair? 18 A. We've had patients that have 19 mutations that were consistent with autism 20 that we identified in our laboratory. 21 Q. Okay. And you, Dr. Cabrera, 22 never diagnosed a patient with autism or 23 ADHD, correct? 24 A. I don't do diagnosis for 25 autism.</p>
<p style="text-align: right;">Page 71</p> <p>1 any of them? 2 A. Not just the top of my head. I 3 have to have the grant in front of me to tell 4 you which one of the compounds we're looking 5 at. 6 Q. Okay. Are you doing that at 7 Baylor? 8 A. Yes, we are. 9 Q. And who is funding that? 10 A. Right now, it's not funded. 11 Q. Is that -- what portion of the 12 work you're doing now in -- at Baylor is 13 that, is antiepileptic animal studies? 14 A. I've only had one grant funded 15 in antiepileptic drugs, even though we've 16 studied it for decades, and none of our 17 funded work right now is in anticonvulsant 18 drugs. 19 Q. Okay. What is your funded work 20 now? 21 A. In anti -- the HIV antivirals. 22 Q. Oh, it's what we've talked 23 about before? 24 A. Yes. 25 Q. Is that the majority of your</p>	<p style="text-align: right;">Page 73</p> <p>1 Q. Okay. 2 A. But the patient herself was -- 3 did have autism. 4 Q. Do you know the diagnostic 5 criteria to diagnose a patient with autism? 6 A. I'm familiar with the DSM for 7 diagnostic, but I'm not -- haven't performed 8 the test, nor am I licensed to do such. 9 Q. Okay. What are the -- what are 10 the diagnostic criteria for autism? 11 A. So typically it's -- has to do 12 with focus and attention, repetitive behavior 13 and then social communication disorder. 14 Q. And do you know to what extent 15 any or all of those need -- boxes need to be 16 checked in order to render an autism 17 diagnosis? 18 A. There's a score system that's 19 based on that, and -- again, I'm not a 20 diagnostician in that regard. And then the 21 last one is that they should have a negative 22 effect on the person that has autism. And so 23 meeting all those criteria is enough to 24 create the diagnosis. But I -- I'm not 25 familiar with the scoring because I don't do</p>

<p>Page 74</p> <p>1 that in my -- in my regular work.</p> <p>2 Q. Okay. What do you mean by</p> <p>3 "negative effect"?</p> <p>4 A. That it has a detrimental</p> <p>5 effect on the well-being of the person.</p> <p>6 Q. Okay. So if somebody is a</p> <p>7 savant, is that a detrimental effect?</p> <p>8 A. Well, if it has negative</p> <p>9 effects on them otherwise, as far as social</p> <p>10 and communication, then that could be an</p> <p>11 indication of that.</p> <p>12 Q. Okay. And if I asked you the</p> <p>13 same questions with regard to ADHD, would you</p> <p>14 give me the same answers; in that you don't</p> <p>15 know the exact criteria and you don't</p> <p>16 diagnose?</p> <p>17 A. I don't do the diagnostics for</p> <p>18 ADHD.</p> <p>19 Q. And you don't know the</p> <p>20 diagnostic criteria exactly, correct?</p> <p>21 A. Outside of what's in the DSM, I</p> <p>22 have not and never plan on performing those</p> <p>23 tests.</p> <p>24 Q. Okay. And you just testified</p> <p>25 about genetic changes that you thought were</p>	<p>Page 76</p> <p>1 pattern of mutations that's known for</p> <p>2 autistic patients at this point?</p> <p>3 A. There are some major genes that</p> <p>4 have been associated with autism, and there</p> <p>5 are also other minor genes that have been</p> <p>6 shown to interact with the autism risk.</p> <p>7 Q. Right.</p> <p>8 And interaction itself, it's</p> <p>9 still wide open, right, as to what actually</p> <p>10 causes autism genetically, in your mind?</p> <p>11 A. Well, it depends on the</p> <p>12 particular case.</p> <p>13 Q. Right.</p> <p>14 It's not a -- it's not a</p> <p>15 uniform presentation genetically, even for</p> <p>16 genetically caused autism, correct?</p> <p>17 A. It depends on the case.</p> <p>18 Q. Okay. Well, did autism exist</p> <p>19 before pharmaceutical compounds existed?</p> <p>20 A. As far as I know, yes.</p> <p>21 Q. Okay. There's autism</p> <p>22 documented back in ancient Egypt, right?</p> <p>23 A. I'm not familiar with that</p> <p>24 record. I'd like to see that document.</p> <p>25 Q. Okay. When do you first know</p>
<p>Page 75</p> <p>1 consistent with autism.</p> <p>2 Was that following whole-exome</p> <p>3 sequencing?</p> <p>4 A. We did perform whole-exome</p> <p>5 sequencing on that -- on that individual.</p> <p>6 Q. Okay. And you've seen -- have</p> <p>7 you seen point mutations that you thought</p> <p>8 were consistent with autism?</p> <p>9 A. In this particular case, we saw</p> <p>10 a mutation that was in a particular gene that</p> <p>11 we then produced a mouse model for, and the</p> <p>12 mouse model displayed behaviors also that</p> <p>13 were consistent with autism. And so</p> <p>14 collectively, we reported that this gene was</p> <p>15 associated with core behaviors in the mouse</p> <p>16 and would be specific for this human.</p> <p>17 And then another colleague at</p> <p>18 Baylor identified multiple other patients</p> <p>19 with the same mutation, the same gene with</p> <p>20 similar presentation.</p> <p>21 Q. And there's multiple mutations</p> <p>22 that have been identified in patients with</p> <p>23 autism, correct?</p> <p>24 A. That is correct.</p> <p>25 Q. And is there any consistent</p>	<p>Page 77</p> <p>1 of autism being diagnosed in human beings?</p> <p>2 Not diagnosed.</p> <p>3 When do you first know of</p> <p>4 autism symptoms being observed in human</p> <p>5 beings, in the human record?</p> <p>6 A. Well, consistent with a</p> <p>7 clinical diagnosis, I was only following the</p> <p>8 literature since probably the -- me</p> <p>9 personally, since the DSMs had been in</p> <p>10 development and listed autism and infantile</p> <p>11 autism as particular outcomes.</p> <p>12 Prior to that, there are</p> <p>13 behaviors consistent with what we now think</p> <p>14 of as autism but not a clinical diagnosis of</p> <p>15 autism.</p> <p>16 Q. And when you were following --</p> <p>17 so how long has that been that you've had</p> <p>18 some awareness of autism?</p> <p>19 A. Since -- I think since I was</p> <p>20 being trained in teratology.</p> <p>21 Q. Okay. And since you were being</p> <p>22 trained in teratology, had you ever looked</p> <p>23 into thimerosal as a cause of autism?</p> <p>24 A. I did look at heavy metals and</p> <p>25 particularly thimerosal as well.</p>

<p style="text-align: right;">Page 78</p> <p>1 Q. Okay. And sitting here today,</p> <p>2 do you believe that thimerosal causes autism?</p> <p>3 A. Not thimerosal as a particular</p> <p>4 compound, but mercury, as a causative agent,</p> <p>5 is associated with the same endpoints that</p> <p>6 are identified in AOP 20.</p> <p>7 Q. Right.</p> <p>8 So do you believe -- do you</p> <p>9 believe that mercury induces autism?</p> <p>10 A. I believe that mercury can</p> <p>11 increase the risk for autism, yes.</p> <p>12 Q. So mercury can cause autism in</p> <p>13 a particular patient, correct, in your view?</p> <p>14 A. Depending on the exposure, it's</p> <p>15 been shown that mercury exposure can increase</p> <p>16 the risk for autism.</p> <p>17 Q. Okay. Can --</p> <p>18 A. And that is causative in</p> <p>19 regards to the AOP.</p> <p>20 Q. Okay. Can -- so the AOP itself</p> <p>21 is enough for you to determine causation in</p> <p>22 that instance?</p> <p>23 A. It's not enough to determine</p> <p>24 causation, but it's enough to demonstrate</p> <p>25 molecular interactions that can produce a</p>	<p style="text-align: right;">Page 80</p> <p>1 Q. Sitting here today, do you</p> <p>2 believe that thimerosal causes autism?</p> <p>3 A. I haven't looked at it in</p> <p>4 detail enough to know that.</p> <p>5 Q. Okay. Can you exclude it as a</p> <p>6 cause of autism?</p> <p>7 A. I would say that there's -- in</p> <p>8 regards to vaccination, that that literature</p> <p>9 has not supported thimerosal specifically as</p> <p>10 a -- as a cause.</p> <p>11 Q. Did you ever look at all the</p> <p>12 thimerosal vaccine literature?</p> <p>13 A. Yes, I did.</p> <p>14 Q. Okay. And did you look at it</p> <p>15 prior to that being debunked?</p> <p>16 A. Concurrently.</p> <p>17 Q. Concurrently.</p> <p>18 So you didn't look at it before</p> <p>19 it was debunked, correct?</p> <p>20 A. Well, I was familiar with the</p> <p>21 study when it came out, and then with, would</p> <p>22 you say, this controversy surrounding how the</p> <p>23 study was conducted, and then the aftermath</p> <p>24 of that. I was familiar with all that, yes.</p> <p>25 Q. Okay. So you know that there</p>
<p style="text-align: right;">Page 79</p> <p>1 presentation based on biological structure.</p> <p>2 Q. And then you, Dr. Cabrera, make</p> <p>3 the additional leap and say that it's</p> <p>4 causative, correct?</p> <p>5 A. There -- there's no leap there.</p> <p>6 Then you would apply Bradford Hill in order</p> <p>7 to determine whether there's a -- there's</p> <p>8 causality.</p> <p>9 Q. So you, Dr. Cabrera, then apply</p> <p>10 Bradford Hill as you see it and determine</p> <p>11 causality, correct?</p> <p>12 A. So -- well, you systematically</p> <p>13 review the literature and see if -- how the</p> <p>14 different factors in regards to Bradford Hill</p> <p>15 support causality or not.</p> <p>16 Q. And you've done that for</p> <p>17 mercury and determined that it's causative,</p> <p>18 correct?</p> <p>19 A. I've looked at that for</p> <p>20 mercury.</p> <p>21 Q. Okay. Have you looked at it</p> <p>22 for thimerosal?</p> <p>23 A. Not as thimerosal as a, you</p> <p>24 know, derivative of a mercury-containing</p> <p>25 compound, no.</p>	<p style="text-align: right;">Page 81</p> <p>1 were something like 14 studies that initially</p> <p>2 indicated that thimerosal might induce autism</p> <p>3 via vaccination, correct?</p> <p>4 A. I'm -- I don't know what the</p> <p>5 count is on that.</p> <p>6 Q. Okay. But you know that at</p> <p>7 some point there were a whole bunch of</p> <p>8 studies, whatever number, that people -- some</p> <p>9 scientists believed indicated that thimerosal</p> <p>10 could cause autism, correct?</p> <p>11 A. I'm familiar with of that.</p> <p>12 Q. Okay. And at the time you</p> <p>13 hadn't looked at those, right?</p> <p>14 A. At the time?</p> <p>15 Q. At -- well, when they were only</p> <p>16 those studies that had some people, some</p> <p>17 scientists, some plaintiffs' lawyers,</p> <p>18 believing that thimerosal could induce</p> <p>19 autism, you hadn't looked at those, right?</p> <p>20 A. I was familiar with the</p> <p>21 literature --</p> <p>22 MR. TRACEY: Objection to the</p> <p>23 form.</p> <p>24 THE WITNESS: I was familiar</p> <p>25 with the literature supporting that</p>

Page 82

1 position.

2 QUESTIONS BY MR. MURDICA:

3 Q. Okay. And did you believe at

4 the time that thimerosal could cause autism?

5 A. Well, I was familiar with the

6 fact that mercury could produce neurotoxicity

7 and neurodevelopmental toxicity, but I

8 wasn't -- specific in regards to thimerosal,

9 I wasn't -- I hadn't drawn any conclusions in

10 regard to -- specifically to thimerosal.

11 Q. Okay. And you know that since

12 then, it's the unanimous opinion of

13 scientists that thimerosal does not cause

14 autism, correct?

15 A. I don't know about the

16 unanimous decision, but I can say it's

17 generally accepted.

18 Q. Okay. And do you accept that,

19 Dr. Cabrera?

20 A. I think that it's still unclear

21 in regards to the effects that mercury can

22 have. And I know people know now that

23 they've removed it out of all of the

24 vaccines, but there's not going to be any

25 more data on that.

Page 83

1 So it's still open, and I don't

2 think it'll be ever closed completely.

3 Q. Do you consider yourself an

4 anti-vaxxer?

5 A. I do not.

6 Q. Okay. You accept the science

7 as it comes, right?

8 A. I weigh it as I'm trained to

9 do.

10 Q. Okay. Does maternal fever

11 cause autism?

12 A. Maternal fever can also

13 increase the risk for autism.

14 Q. Okay. So you keep saying

15 "increase the risk," when I say "cause."

16 Here, you're proposing to tell

17 the world that acetaminophen can cause

18 autism, correct?

19 A. Well, I've conducted an

20 analysis consistent with causality for

21 acetaminophen. I haven't done the same

22 analysis for fever, but I'm familiar with the

23 literature on fever increasing the risk for

24 autism, and that can be consistent with a

25 causal effect.

Page 84

1 Q. Okay. And you realize that

2 many of the patients that are pregnant that

3 take acetaminophen have maternal fever and

4 that's why they take it, right? That's one

5 of the indications?

6 A. I think it's a compound

7 question, but one of the indications for

8 acetaminophen is -- taking acetaminophen is

9 fever.

10 Q. Right.

11 But yet, you haven't done a

12 full study of fever as a causative agent --

13 as a causative exposure for autism, correct?

14 A. I have a proposal to do that,

15 but we have not --

16 Q. And where is that proposal?

17 A. On my computer.

18 Q. Okay. I mean --

19 A. I've sent it off once. I'm

20 going to be resubmitting that for funding.

21 Q. Okay. And I guess that's what

22 I was asking.

23 So it's a proposal to get

24 funding to, what, the NIH or something like

25 that?

Page 85

1 A. Yeah. So when I was in

2 graduate school, we did increase in maternal

3 body temperature as another model for neural

4 tube defects and showed that fever can

5 produce neural tube defects, and I would like

6 to follow up that work with the effect of

7 fever on autism as an outcome.

8 Q. Okay. In Dr. Cabrera's view,

9 what else are you -- what other exposures, if

10 any, are you convinced can cause autism?

11 A. Things that's supported in the

12 literature, fever would be one of them, in

13 addition to heavy metals such as mercury.

14 And there's also -- and I'd say that the

15 data, at least at this point, is insufficient

16 but supportive of -- would be small particle,

17 air pollution particularly, benzopyrene and

18 some industrial compounds in that -- in those

19 particles.

20 Q. Okay. And have you looked at

21 any of those in the context of litigation?

22 A. I have not. Well, some heavy

23 metals I have, but not in regards to autism.

24 Q. Okay. In regards to autism or

25 ADHD, have you looked at any other

<p style="text-align: right;">Page 86</p> <p>1 environmental exposures outside of the</p> <p>2 context of litigation?</p> <p>3 A. I have not.</p> <p>4 MR. WATTS: Hey, Jim, we've</p> <p>5 been going about an hour.</p> <p>6 MR. MURDICA: Yeah.</p> <p>7 MR. WATTS: First break?</p> <p>8 MR. MURDICA: Sure, that's</p> <p>9 fine.</p> <p>10 VIDEOGRAPHER: Off the record,</p> <p>11 10:01.</p> <p>12 (Off the record at 10:01 a.m.)</p> <p>13 VIDEOGRAPHER: The time is</p> <p>14 10:22, back on the record. Beginning</p> <p>15 of Media 2.</p> <p>16 QUESTIONS BY MR. MURDICA:</p> <p>17 Q. Okay. Dr. Cabrera, are you</p> <p>18 ready to proceed?</p> <p>19 A. I am.</p> <p>20 Q. Okay. I'm going to ask you</p> <p>21 some questions about basics of statistics in</p> <p>22 reviewing some of the articles that are part</p> <p>23 of your report.</p> <p>24 Dr. Cabrera, do you believe</p> <p>25 that results need to be statistically</p>	<p style="text-align: right;">Page 88</p> <p>1 doesn't include the null typically.</p> <p>2 Q. Okay. And conversely -- so</p> <p>3 that could be a finding that's significant</p> <p>4 that shows an effect, right? Because it's</p> <p>5 over 1 in the -- in both ends of the</p> <p>6 confidence interval, correct?</p> <p>7 A. To clarify, you can have an</p> <p>8 increase in risk, and that would be greater</p> <p>9 than 1, or a decrease in risk, and that would</p> <p>10 be less than 1 --</p> <p>11 Q. Right.</p> <p>12 A. -- as far as the point</p> <p>13 estimate.</p> <p>14 Q. And if the confidence interval</p> <p>15 and the point estimate are all less than 1,</p> <p>16 that is a decrease in risk, correct?</p> <p>17 A. That can be interpreted as a</p> <p>18 decrease in risk.</p> <p>19 Q. And it could be interpreted as</p> <p>20 whatever that exposure is is protective</p> <p>21 against whatever the effect is, correct?</p> <p>22 A. So, yeah. I mean, effectively</p> <p>23 it's whether you're accepting or rejecting a</p> <p>24 null hypothesis. In that case, you can say,</p> <p>25 you know, we're not accepting, we're</p>
<p style="text-align: right;">Page 87</p> <p>1 significant to be meaningful?</p> <p>2 A. Not necessarily.</p> <p>3 Q. Okay. Are you part of a group</p> <p>4 supporting abandonment of statistical</p> <p>5 significance in epidemiology?</p> <p>6 A. Not abandonment, but just</p> <p>7 clarification inasmuch as when those</p> <p>8 statistics were introduced, they weren't</p> <p>9 introduced for the -- for the kind of line in</p> <p>10 the sand that has been drawn with them. That</p> <p>11 was not their intention when they were</p> <p>12 introduced.</p> <p>13 Q. Okay. In your opinions here,</p> <p>14 in forming a causation opinion, are you</p> <p>15 relying for causation on any results that did</p> <p>16 not achieve statistical significance?</p> <p>17 A. I'm relying on the totality of</p> <p>18 evidence, and some of that did not achieve</p> <p>19 statistical significance.</p> <p>20 Q. Okay. And just so we</p> <p>21 understand, statistical significance would be</p> <p>22 where a result finds an odds ratio or a</p> <p>23 relative risk that does not include the null,</p> <p>24 correct?</p> <p>25 A. The confidence interval that</p>	<p style="text-align: right;">Page 89</p> <p>1 rejecting.</p> <p>2 Q. Right.</p> <p>3 And if an exposure has a point</p> <p>4 estimate and a confidence interval that's</p> <p>5 entirely under 1, in that study, in that</p> <p>6 population, it would be -- it would show a</p> <p>7 protectiveness of that exposure to the end</p> <p>8 effect, correct?</p> <p>9 A. A decrease in risk.</p> <p>10 Q. Okay. Sure.</p> <p>11 P-value, what does a p-value</p> <p>12 need to be to be meaningful to you,</p> <p>13 Dr. Cabrera?</p> <p>14 A. So p-values generally would be</p> <p>15 set as a -- as a function of whatever</p> <p>16 analysis you're doing, preferably before you</p> <p>17 conduct the analysis. And most commonly,</p> <p>18 it's the -- the alpha set it to -- it's</p> <p>19 referred to a 0.05. So it's a 5 percent</p> <p>20 false discovery.</p> <p>21 Q. Right.</p> <p>22 That's the statistical</p> <p>23 convention that most people use, correct?</p> <p>24 A. Depending on the type of</p> <p>25 analysis you're doing. In some cases it may</p>

<p style="text-align: right;">Page 90</p> <p>1 be lowered depending on the type of analysis</p> <p>2 you're doing.</p> <p>3 Q. You've seen p-values that come</p> <p>4 out to be .00001, right?</p> <p>5 A. Yes, I have.</p> <p>6 Q. And that would be more</p> <p>7 meaningful to you than .05, wouldn't it?</p> <p>8 A. It's not a more meaningful.</p> <p>9 It's just in regards to whether we're looking</p> <p>10 that as a -- as part of our false discovery,</p> <p>11 or you're not liable to find that as part of</p> <p>12 your false discovery.</p> <p>13 Q. And as part of false discovery,</p> <p>14 if your p-value is .1, that would be an</p> <p>15 increased chance that you made a false</p> <p>16 discovery, correct?</p> <p>17 A. Yeah, you -- it's correct.</p> <p>18 Q. .1 -- by convention, .1</p> <p>19 wouldn't be a very good p-value, right?</p> <p>20 A. Passing judgment, if you set</p> <p>21 out in your statistical testing to set it at</p> <p>22 something less than 0.05, generally you would</p> <p>23 need to justify that, why you're setting that</p> <p>24 at .1, so it would depend on the analysis</p> <p>25 you're doing.</p>	<p style="text-align: right;">Page 92</p> <p>1 came to Baylor on SSRIs.</p> <p>2 Q. Okay.</p> <p>3 A. Particularly sertraline.</p> <p>4 Q. I'm sorry?</p> <p>5 A. Particularly sertraline.</p> <p>6 Q. Oh, sertraline.</p> <p>7 A. Yes.</p> <p>8 Q. Got it. Got it.</p> <p>9 And do you recall what the</p> <p>10 conclusion was of your research or your</p> <p>11 paper?</p> <p>12 A. Yes. We found that it had a</p> <p>13 teratogenic effect. Specifically we found</p> <p>14 clefting in the animals.</p> <p>15 Q. And that was a paper right when</p> <p>16 you started your work at Baylor?</p> <p>17 A. Yeah, it coincided -- I'm not</p> <p>18 sure if we published that while we were at</p> <p>19 Baylor or while we were at UT, just before we</p> <p>20 left. I would have to look at specifically</p> <p>21 when we published that.</p> <p>22 Q. Got it.</p> <p>23 In the context of litigation,</p> <p>24 have you ever worked on SSRIs?</p> <p>25 A. Yes, I have.</p>
<p style="text-align: right;">Page 91</p> <p>1 Q. Okay, sure.</p> <p>2 But that wouldn't -- that</p> <p>3 wouldn't be a result that would be very</p> <p>4 exciting to you based on statistical</p> <p>5 convention, correct?</p> <p>6 A. Depending on the analysis I'm</p> <p>7 doing, but generally speaking, particularly</p> <p>8 with tests that you haven't run before, you</p> <p>9 would start out with an alpha of 0.05.</p> <p>10 Q. Okay. I'm going to ask you</p> <p>11 some questions about SSRIs.</p> <p>12 Dr. Cabrera, do you believe</p> <p>13 sitting here today that SSRIs cause autism?</p> <p>14 A. I haven't looked in the</p> <p>15 literature in regards to the SSRIs and</p> <p>16 autism.</p> <p>17 Q. Do you believe that SSRIs cause</p> <p>18 ADHD?</p> <p>19 A. I haven't looked in the</p> <p>20 literature with regards to SSRIs and ADHD.</p> <p>21 Q. Okay. Did you ever work out --</p> <p>22 did you ever work on SSRIs at Baylor?</p> <p>23 A. I -- we -- I believe we did</p> <p>24 publish a paper. I'm not sure if it was</p> <p>25 while we were at Baylor or just before we</p>	<p style="text-align: right;">Page 93</p> <p>1 Q. Okay. And when was that?</p> <p>2 A. It's on my CV. I don't have</p> <p>3 the exact year.</p> <p>4 Q. Okay.</p> <p>5 A. It's been several years.</p> <p>6 Q. Did you draw any conclusions in</p> <p>7 the context of litigation regarding SSRIs?</p> <p>8 A. Yes. We were looking at</p> <p>9 outcomes for developmental toxicity and</p> <p>10 particularly impacts on congenital</p> <p>11 malformations.</p> <p>12 Q. Okay. And that was for</p> <p>13 litigation, right?</p> <p>14 A. Yes.</p> <p>15 Q. And was that for lawyers based</p> <p>16 in Houston?</p> <p>17 A. In part.</p> <p>18 Q. Okay. Was that for Mr. Tracey?</p> <p>19 A. In part.</p> <p>20 Q. And what did you conclude in</p> <p>21 that litigation? Did you find a relationship</p> <p>22 between SSRIs and developmental outcomes?</p> <p>23 A. We did find support for that,</p> <p>24 yes.</p> <p>25 Q. And did you render an opinion</p>

<p style="text-align: right;">Page 94</p> <p>1 that SSRIs cause developmental issues?</p> <p>2 A. Yes, I did.</p> <p>3 Q. And what issues did you say</p> <p>4 SSRIs caused?</p> <p>5 A. At the time the major</p> <p>6 congenital malformation that was of interest</p> <p>7 was congenital heart defects.</p> <p>8 Q. In the context of litigation,</p> <p>9 have you evaluated any other exposures and</p> <p>10 developmental outcomes?</p> <p>11 A. Can you repeat the question?</p> <p>12 Q. Sure. No problem. We had a</p> <p>13 little unexpected phone call there.</p> <p>14 In the context of litigation,</p> <p>15 outside of your regular work --</p> <p>16 A. Uh-huh.</p> <p>17 Q. -- have you evaluated any other</p> <p>18 exposures and developmental outcomes?</p> <p>19 A. Yes.</p> <p>20 Q. And what are those?</p> <p>21 A. Largely occupational exposures</p> <p>22 and environmental exposures.</p> <p>23 Q. Okay. Have you -- have you</p> <p>24 ever done work in the context of litigation</p> <p>25 on the drug Paxil?</p>	<p style="text-align: right;">Page 96</p> <p>1 Q. All right. I'll ask you again</p> <p>2 in case you remember it.</p> <p>3 A. Yeah. Pozner. Maybe Pozner,</p> <p>4 Pozner.</p> <p>5 Q. Oh, yes. Reilly -- Reilly</p> <p>6 Pozner.</p> <p>7 A. Yeah.</p> <p>8 Q. Or Pozner Reilly. Yeah, okay.</p> <p>9 Dr. Cabrera, do you know if</p> <p>10 your opinion on SSRIs -- you said SSRIs cause</p> <p>11 developmental defects, correct?</p> <p>12 A. Yes.</p> <p>13 Q. And was that opinion accepted</p> <p>14 in court?</p> <p>15 A. As far as --</p> <p>16 MR. TRACEY: Objection. Form.</p> <p>17 Go ahead. You can answer,</p> <p>18 Robert.</p> <p>19 THE WITNESS: As far as my</p> <p>20 opinion, it's -- there was --</p> <p>21 accepted. I think there was also</p> <p>22 some -- also another expert was</p> <p>23 rejected, and so overall, that was not</p> <p>24 accepted.</p> <p>25</p>
<p style="text-align: right;">Page 95</p> <p>1 A. Yes, I have.</p> <p>2 Q. And that was also for</p> <p>3 plaintiffs' lawyers in Houston, correct?</p> <p>4 A. That's correct.</p> <p>5 Q. Okay. Was your work on Paxil</p> <p>6 the first work that you did with plaintiffs'</p> <p>7 lawyers?</p> <p>8 A. I believe the first work we did</p> <p>9 was with sertraline.</p> <p>10 Q. Okay. And it's all been in</p> <p>11 part with the same firm that we're sitting in</p> <p>12 now, the Tracey law firm, correct?</p> <p>13 A. No, it's not correct.</p> <p>14 Q. Okay. What other firms has it</p> <p>15 been with?</p> <p>16 A. I've also worked with some</p> <p>17 other firms in our area and then also in</p> <p>18 Colorado as well.</p> <p>19 Q. Okay. And which firms are</p> <p>20 those?</p> <p>21 A. Here, Clark -- Clark Love</p> <p>22 Hutson.</p> <p>23 Q. Uh-huh.</p> <p>24 A. And in Colorado, I would have</p> <p>25 to get the particular firm name. It's --</p>	<p style="text-align: right;">Page 97</p> <p>1 QUESTIONS BY MR. MURDICA:</p> <p>2 Q. You have an understanding that</p> <p>3 you were excluded as -- you were not</p> <p>4 determined to be a qualified expert. You</p> <p>5 were excluded from that litigation, correct?</p> <p>6 A. I was qualified as an expert,</p> <p>7 but my understanding is that based on the</p> <p>8 exclusion of the epidemiologist, the case</p> <p>9 didn't move forward.</p> <p>10 Q. Do you know you were excluded</p> <p>11 as an expert?</p> <p>12 A. I think collectively because of</p> <p>13 the exclusion of the epidemiologist, we were</p> <p>14 excluded.</p> <p>15 Q. Okay. So you don't deny that</p> <p>16 you were excluded as an expert in SSRI</p> <p>17 litigation, correct?</p> <p>18 MR. TRACEY: Object to the</p> <p>19 form.</p> <p>20 THE WITNESS: Yeah. To be</p> <p>21 clear, there were some criticisms</p> <p>22 rendered in regards to my opinion, but</p> <p>23 my understanding is that the exclusion</p> <p>24 was based on the rejection of the</p> <p>25 epidemiologist.</p>

Page 98

1 QUESTIONS BY MR. MURDICA:
 2 Q. Have you ever seen the opinion?
 3 A. I've read it.
 4 Q. When's the last time you read
 5 it?
 6 A. It's been several years.
 7 Q. Okay. We'll take a look at it
 8 later.
 9 In Paxil, what opinion did you
 10 render there?
 11 A. That it could also increase the
 12 risk of adverse outcome in -- with in utero
 13 exposure.
 14 Q. Okay. So to be clear,
 15 plaintiffs' lawyers hired you in Paxil
 16 litigation, and you offered an opinion that
 17 Paxil could cause developmental defects,
 18 correct?
 19 A. That's correct.
 20 Q. Okay. Did you ever testify in
 21 court on that?
 22 A. I did not.
 23 Q. Do you know if your opinion --
 24 did you ever testify at a deposition about
 25 that?

Page 99

1 A. Yes, I did.
 2 Q. Okay. Do you have a copy of
 3 that transcript?
 4 A. I do not.
 5 Q. Do you generally -- when you do
 6 work for plaintiffs' lawyers, do you get
 7 copies of the transcripts afterwards?
 8 A. Sometimes. Not always.
 9 Q. Okay. Do you keep them?
 10 A. From that long ago, I wouldn't
 11 still have it.
 12 Q. Okay. How about from SSRIs, do
 13 you have those transcripts?
 14 A. I do not think I have any of
 15 those S -- SSRI transcripts.
 16 Q. Okay. When is the last time
 17 you testified at deposition before today?
 18 A. My last depositions were just
 19 in the last few years. I've given some
 20 depositions.
 21 Q. Okay.
 22 A. But not on SSRIs.
 23 Q. Were they on -- were they in
 24 litigation?
 25 A. Yes.

Page 100

1 Q. Were they on environmental
 2 exposures?
 3 A. And occupational --
 4 environmental and occupational exposures.
 5 Q. Okay. And in each of those
 6 instances where you gave a deposition, were
 7 you being paid by the plaintiffs' attorney?
 8 A. Yes, I was.
 9 Q. And is that the case going back
 10 all the way to Paxil, that whenever you've
 11 given a deposition rendering an opinion about
 12 an exposure, it has been for a plaintiff's
 13 attorney?
 14 A. That is correct.
 15 Q. And in each of those, when
 16 you've given a deposition being paid by a
 17 plaintiff's attorney, you've always come to
 18 the conclusion that the exposure caused a
 19 defect, correct?
 20 A. To be clear, in the cases I
 21 reviewed where I didn't support that opinion,
 22 I haven't been deposed on them.
 23 Q. Well, let me -- let me ask
 24 again because I understand what you're
 25 saying, but I want to get a clear answer on

Page 101

1 this one.
 2 Every time that you've been
 3 deposed in litigation, it has been when
 4 you've been paid by a plaintiff's attorney
 5 and when you've come to the conclusion that
 6 the exposure caused the -- a defect in a
 7 human being, correct?
 8 A. So I've been paid by
 9 plaintiffs' attorneys to offer my opinion.
 10 When I found that there wasn't evidence
 11 enough, I've never been deposed about that
 12 opinion.
 13 Other times, I have been
 14 deposed, and in those cases, they were
 15 plaintiff opinions or opinions that I
 16 submitted because I was asked to by a
 17 plaintiff attorney.
 18 Q. Do you remember my question?
 19 A. Yes.
 20 Q. What was it?
 21 A. You were asking me if I had
 22 ever rendered an opinion asked by plaintiffs'
 23 attorneys to -- if all of the opinions that I
 24 rendered were asked for by plaintiffs'
 25 attorneys.

Page 102

1 Q. My question was, every time
2 that you've been deposed in litigation, it
3 has been in an instance where you're being
4 paid by a plaintiff's attorney and where
5 you've rendered an opinion that the exposure
6 caused an outcome of a defect in a human
7 being, correct?

8 A. So -- and I'm just clarifying
9 that.

10 Q. Is that a "yes" or a "no"?

11 A. Well, my clarification is I
12 have rendered those opinions, and the ones
13 that were at deposition, I was paid by a
14 plaintiff's attorney.

15 But I've also been asked to
16 render opinions, and when I found that there
17 wasn't evidence, then I didn't go to
18 deposition. I wasn't asked to provide a
19 deposition in that regard.

20 Q. Okay. And do you have any
21 proof of any kind that you've rendered
22 opinions finding a lack of a causal
23 connection between an exposure and a -- an
24 outcome in a human being where you haven't
25 gone to deposition?

Page 103

1 A. Regular conversations --

2 MR. TRACEY: Objection to form.

3 THE WITNESS: Regular
4 conversations I have with -- when I am
5 consulting, right.

6 QUESTIONS BY MR. MURDICA:

7 Q. There's nothing you can show me
8 or the Court here that that's ever actually
9 happened, right?

10 A. Well, it's confidential, so I
11 can't -- I can't --

12 MR. TRACEY: Yeah, Robert. Be
13 careful about confidentiality, Robert.

14 QUESTIONS BY MR. MURDICA:

15 Q. Yeah. I just want to be clear
16 for the record, for the Court, because that's
17 who's ultimately going to read this.

18 Sitting here today, there's
19 nothing you could show the Court to verify
20 what you just said about ever opining other
21 than the exposure caused the defect, correct?

22 MR. TRACEY: So, Robert, hold
23 on. I want you to be careful about
24 that question, because if there exists
25 evidence that satisfies that question,

Page 104

1 that is, if there is evidence where
2 you have told lawyers that they don't
3 have a case, but that is confidential,
4 that exists, but you may not be able
5 to disclose it.

6 Are you with me?

7 THE WITNESS: Yes, and that's
8 what I've conveyed. I can't disclose
9 that.

10 QUESTIONS BY MR. MURDICA:

11 Q. Okay. And I'm just saying,
12 there's nothing you can disclose to show that
13 you've ever rendered an opinion other than
14 the exposure caused the defect for a
15 plaintiff's attorney, correct?

16 MR. TRACEY: Well, no, object
17 to the form. It's other than
18 confidential information.

19 MR. MURDICA: Okay. I will ask
20 it again, Mr. Tracey.

21 QUESTIONS BY MR. MURDICA:

22 Q. Is it your testimony that you
23 have confidential information that you would
24 be able to show if it wasn't confidential and
25 that we may be able to get a Court to protect

Page 105

1 or maybe you could provide to the Court
2 directly to show that you've ever rendered an
3 opinion for a plaintiff's attorney other than
4 one that supported their theory that an
5 exposure caused an outcome in a human being?

6 A. Yes, I have. I provided that
7 opinion confidentially before.

8 Q. Okay. And you have proof of
9 that. You -- it's just -- you just can't
10 show it to us because it's confidential,
11 correct?

12 A. I could produce proof of that,
13 but it's confidential.

14 Q. Okay. For the stuff that we
15 are able to discover and that the Court can
16 see, you've always sided with the plaintiff
17 when it comes to an exposure and an adverse
18 outcome in a human being in litigation,
19 correct?

20 A. To be clear, I've only been
21 asked by plaintiffs' attorneys to render
22 opinions in the past.

23 Q. Okay. And when you do that
24 kind of work for plaintiffs' attorneys, do
25 you seek the permission of UT or Baylor to do

Page 106

1 it?

2 A. I have not. I consult

3 independently for that.

4 Q. Okay. Do you know if Baylor or

5 UT have a policy about work outside of the

6 universities?

7 A. I'm required to file conflict

8 of interest.

9 Q. Okay. And you did so here, I

10 assume?

11 A. I've filed a conflict of

12 interest with my company.

13 Q. What does that mean, with your

14 company?

15 A. So my -- I file a conflict of

16 interest under my company with Baylor.

17 Q. Okay. So Baylor does know that

18 you are testifying against the entire

19 industry of manufacturers of acetaminophen,

20 correct?

21 A. Baylor knows that I work for a

22 consulting company --

23 MR. TRACEY: Object to form.

24 THE WITNESS: -- that is

25 working in litigation, not the

Page 107

1 specific cases.

2 QUESTIONS BY MR. MURDICA:

3 Q. So they don't know your actual

4 opinion here, correct?

5 A. They do not.

6 Q. Okay. Have you shared your

7 opinion here with anyone other than the

8 plaintiffs' attorneys and anyone that they've

9 given your reports to?

10 A. Yes, I have.

11 Q. Who is that?

12 A. My laboratory.

13 Q. Okay. Outside of your

14 laboratory, have you shared it with anyone

15 else?

16 A. My wife.

17 Q. Okay. Outside of a personal

18 relationship, have you shared it with anyone

19 else?

20 A. Outside of my laboratory and

21 personal relationships, I have not.

22 Q. You haven't, for example,

23 contacted any of the scientists involved in

24 the studies that are contained in your

25 report, have you?

Page 108

1 A. I have had some Zoom

2 interactions with other experts in this

3 regard, but not with any other scientists

4 in the literature.

5 Q. Okay. And by other experts,

6 you mean other hired experts by plaintiffs?

7 A. That's correct.

8 Q. Okay. Outside of hired experts

9 by plaintiffs, have you discussed your

10 opinions that we're -- that we're talking

11 about today with any other scientist outside

12 of your lab or outside of hired experts?

13 A. And outside of personal?

14 Q. Right.

15 A. I have not.

16 Q. Okay. Have you contacted any

17 regulatory authorities or Teratology Society

18 or Maternal-Fetal Medicine or American

19 College of Obstetricians about your opinions?

20 A. I've spoke with an obstetrician

21 in our laboratory, but outside of that, no.

22 Q. Do you think it's important

23 that maternal fever is treated during

24 pregnancy?

25 A. It is important.

Page 109

1 Q. Okay. Why is it important?

2 A. Because fevers have adverse

3 outcomes during pregnancy if they're not

4 controlled.

5 Q. Do they have adverse outcomes

6 for the fetus?

7 A. Yes, they can.

8 Q. And what adverse outcomes can

9 those be?

10 A. Fevers can increase risk for

11 congenital malformations specifically. It's

12 been widely published in the literature and

13 also supported in animal models.

14 Q. And I think you testified

15 earlier that fevers can cause autism,

16 correct?

17 A. That is correct.

18 Q. And fevers can cause ADHD?

19 A. There are studies that support

20 that, yes.

21 Q. Okay. And you don't dispute

22 it, do you?

23 A. I'm not disputing that fevers

24 are dangerous, particularly for --

25 Q. Okay.

Page 110

1 A. -- anyone to have a fever or
 2 too high of a fever or particularly for
 3 pregnant women to have a high fever for a
 4 prolonged period of time is dangerous --
 5 Q. What --
 6 A. -- for the mother and the fetus
 7 or the embryo.
 8 Q. What other
 9 antipyretics would -- what could treat fever
 10 in a pregnant woman that's available on the
 11 market right now?
 12 A. It depends on when the
 13 medication is taken. There are different
 14 contraindications for other antipyretics.
 15 Q. Okay. How about opioids, do
 16 you think women should treat fever with
 17 opioids?
 18 A. I don't think opioids would be
 19 a good way to treat fevers.
 20 Q. Why not?
 21 A. Well, one, they're known to be
 22 addictive. That's a potential problem with
 23 an opioid use, particularly with a pregnant
 24 mother.
 25 Q. Okay. When you just testified

Page 111

1 a minute ago about talking to the other
 2 plaintiffs' experts in this litigation, I
 3 have a couple of questions about that.
 4 When was the last time --
 5 MR. TRACEY: Wait. Wait.
 6 Wait. Wait.
 7 Jim, I thought we had an
 8 agreement that we weren't going to
 9 talk about that.
 10 MR. MURDICA: About experts
 11 talking to experts? I'll look at our
 12 agreement. I thought it was about
 13 lawyers.
 14 MR. TRACEY: I thought it was
 15 any communication -- well, so, I was
 16 there, so it's kind of hard to tease
 17 it out.
 18 MR. MURDICA: All right.
 19 I'll think about that and move on.
 20 MR. TRACEY: Okay. Okay.
 21 (Cabrera Exhibit 2 marked for
 22 identification.)
 23 QUESTIONS BY MR. MURDICA:
 24 Q. Okay. Can I have the rebuttal
 25 report? Or did you bring your reports?

Page 112

1 A. I brought a rebuttal report. I
 2 do have my rebuttal report.
 3 Q. You have your rebuttal report?
 4 A. Yes.
 5 Q. Well, I'll mark a copy so you
 6 can go with an exhibit copy.
 7 Dr. Cabrera, you now have in
 8 front of you Exhibit 2, which is titled your
 9 rebuttal report.
 10 Do you see it?
 11 A. Yes, I do.
 12 Q. Does that look like your
 13 rebuttal report?
 14 A. It does.
 15 Q. Okay. Is this the last report
 16 in writing that you've rendered with regard
 17 to this litigation?
 18 A. Yes, it is.
 19 Q. Okay. Right as we started the
 20 deposition today, your counsel handed me a
 21 stack of articles.
 22 Were those provided by you?
 23 A. Yes, they were.
 24 Q. Okay. And those were since the
 25 rebuttal report, correct?

Page 113

1 A. Yes.
 2 Q. Okay. And that you first
 3 reviewed them since the rebuttal report?
 4 A. Concurrently. I hadn't
 5 included them in the rebuttal report when I
 6 was reading through the literature, and I
 7 believe one of your criteria was that I
 8 provide all the information that I had
 9 reviewed in my opinion, but they aren't
 10 specifically referenced, but I was provided.
 11 Q. Okay. Some of the studies are
 12 not -- one of the studies is from this week,
 13 right?
 14 A. Yes.
 15 Q. Okay. But the rest of them are
 16 from 30, 20, 15 years ago, correct?
 17 A. They vary, yes.
 18 Q. There's no reason you couldn't
 19 have found those before your rebuttal report,
 20 correct?
 21 A. Oh, it wasn't a matter of
 22 finding them. I had found them. They were
 23 just still open on my browser, and I felt it
 24 appropriate that I send them all to counsel
 25 because I had reviewed them.

Page 114

1 Q. Okay. Are they referenced in
2 your rebuttal report or your other report?
3 A. They're references in regard to
4 some of the other expert's opinion that were
5 provided that I hadn't had a chance to
6 include in my report.
7 Q. Okay. So if we looked in your
8 reports, we wouldn't see the citations to the
9 new articles that were handed to me this
10 morning, correct?
11 A. I do not think you would see
12 them, no.
13 Q. Okay. And your testimony is
14 that you wanted to make sure we had
15 everything you ever looked at, even if you
16 didn't reference it, correct?
17 A. Well, because I was looking at
18 it in response to the expert reports that
19 were provided to me that are appropriate,
20 that I provide all of the reports that I did
21 look at.
22 Q. Okay. So now we can be
23 comfortable that we -- between your reliance
24 list and everything I was handed this
25 morning, we have everything you looked at,

Page 115

1 considered in rendering this, correct?
2 A. Well, I looked at some other
3 stuff last night as well, but --
4 Q. Okay. What did you look at
5 last night?
6 A. A couple of studies that
7 were -- I did print them out, but I haven't
8 sent them for counsel yet.
9 Q. Okay. Do you have those with
10 you?
11 A. I do.
12 Q. All right. Can I have them,
13 please?
14 MR. TRACEY: Can we, excuse me,
15 identify them on the record?
16 MR. MURDICA: Yeah, I'll
17 identify them.
18 MR. TRACEY: Okay.
19 MR. MURDICA: Dr. Cabrera just
20 handed me a paper from 2015 called
21 *Biochimica et Biophysica Acta*. That's
22 the journal article. "Glutathione
23 during embryonic development."
24 We'll get copies and mark them
25 later.

Page 116

1
2 QUESTIONS BY MR. MURDICA:
3 Q. Anything else, Doctor? Oh, you
4 have a whole stack?
5 A. No, just this. Just these two.
6 Q. And the paper on oxidative
7 stress from 2019 by an author called Moore.
8 Okay. With those two papers,
9 Dr. Cabrera, can we be satisfied that we have
10 everything you relied on up to this point
11 today?
12 A. I think so, yes.
13 Q. Okay.
14 All right. Is there anything
15 about Exhibit 2, your supplement report --
16 supplemental report, that you don't stand by,
17 that you need to change, that you need to
18 revise, that you need to withdraw, sitting
19 here right now?
20 A. No.
21 Q. Okay. All right. If you turn
22 to the last page of Exhibit 2, that's your
23 signature, right?
24 A. Yes.
25 Q. This is your report?

Page 117

1 A. Yes, it is.
2 Q. Okay. So first thing I want to
3 ask you about is on page 5.
4 In your supplemental report,
5 for the first time you list genes that you
6 say, quote, "interact with acetaminophen."
7 Correct?
8 A. That's correct.
9 Q. Okay. And you start talking
10 about catechol-O-methyltransferase, right?
11 A. That is listed there, yes.
12 Q. And I'm going to butcher the
13 pronunciation because I don't know this one.
14 Capicua?
15 A. Capicua.
16 Q. Capicua?
17 A. Yes.
18 Q. And capicua is something that
19 you've studied in at least one study in your
20 lab, or that Finnell has in his lab, correct?
21 A. Yes, it's one thing we've
22 studied in the group.
23 Q. And you say here in your
24 supplemental report that capicua interacts
25 with acetaminophen in a study of

<p style="text-align: right;">Page 118</p> <p>1 acetaminophen toxicity. And you say that on 2 page 5, correct? 3 A. Just to be clear, I do report 4 that on a multicenter study that was based on 5 murine hepatotoxicity that they looked at 6 this interaction. 7 Q. I'm looking at the sentence 8 "CIC" -- 9 Which is capicua, right? 10 A. Yes. 11 Q. -- "was reported to interact 12 with acetaminophen in a multicenter study of 13 acetaminophen toxicity." 14 Right? 15 A. That's correct. 16 Q. And then you cite Beyer. 17 A. Yes. 18 Q. Okay. Can we mark this, 19 please? 20 (Cabrera Exhibit 3 marked for 21 identification.) 22 QUESTIONS BY MR. MURDICA: 23 Q. Okay. Dr. Cabrera, I marked as 24 Exhibit 3 is -- well, you tell me what it is. 25 A. This is a report by first</p>	<p style="text-align: right;">Page 120</p> <p>1 Q. Something like that? 2 And this is about -- this 3 Exhibit 3 is about hepatotoxicity, which is 4 liver, correct? 5 A. It is about hepatotoxicity, 6 which I do indicate in the report. 7 Q. And this capicua is not 8 mentioned in your initial or amended reports, 9 only in your rebuttal report, correct? 10 A. That is correct. 11 Q. How many other genes, if you 12 remember, were mentioned in that -- in the 13 data supplement to this article? 14 A. I would have to go through and 15 count them, but several. 16 Q. Several or a lot? 17 A. Several other genes. I don't 18 know -- what is a lot? 19 Q. Well, hundreds? Tens? 20 A. Not hundreds. 21 Q. Okay. 22 A. They're -- in regards to gene 23 interactions, I did report that there were 24 273 genes that were reported to interact with 25 acetaminophen in ASD, and that's from the</p>
<p style="text-align: right;">Page 119</p> <p>1 author Beyer titled "Multicenter study of 2 acetaminophen hepatotoxicity reveals the 3 importance of biological endpoints in genomic 4 analysis." 5 Q. Okay. And is this what you 6 cited as footnote 15? 7 A. Yes. 8 Q. Okay. Could you show me where 9 in this exhibit it says that capicua 10 interacts with acetaminophen? 11 A. I think it's actually in the 12 data, in the dataset. 13 Q. Okay. And where is the 14 dataset? 15 A. Online. It's in the dataset 16 here. 17 Q. Okay. If we look in the 18 article, it won't say it anywhere, right? 19 A. No, it's actually in the data. 20 Q. Okay. When is the last time 21 you looked at the data? 22 A. When I wrote the report. 23 Q. Okay. So three weeks ago, a 24 month ago? 25 A. Yes.</p>	<p style="text-align: right;">Page 121</p> <p>1 database, which I previously cited in my 2 first report. 3 Q. Right. 4 Okay. Let's talk about that 5 database. 6 Who hosts that database? 7 A. I'd have to look back. Maybe 8 in North Carolina, or one of the Carolinas. 9 I'll have to look back specifically at the 10 study. 11 Q. Right. 12 And what databases are 13 available, other than that database, if you 14 want to do this type of research on genes and 15 interactions? 16 A. There are numerous databases 17 for looking at these types of interactions. 18 Q. Okay. What databases do 19 geneticists generally rely on? 20 A. Typically, most geneticists, 21 and what I teach the geneticists because I 22 also cover this in my lectures for genetic 23 counselors, is the use of, like, the Online 24 Mendelian Inheritance in Man. And not a 25 specific endorsement, but that would be one.</p>

Page 122

1 Q. OMIM?

2 A. Yes, referred to as OMIM.

3 Q. How about SFARI?

4 A. As far as autism genes, it's a

5 database that's also used.

6 Q. SFARI is?

7 A. Yes.

8 Q. Right.

9 Okay. How about ClinGen?

10 A. It is another database that's

11 used, yes.

12 Q. Okay. This one that you cite

13 is not one that's commonly used, correct?

14 A. This is a database for

15 archiving molecular interactions, where those

16 are more specific to genetics and the

17 presentation of various gene pathologies.

18 Q. Okay. And when you went --

19 when is the last time you went into this

20 database? Was it when you did this rebuttal

21 report?

22 A. That is correct.

23 Q. Okay. Well, I'll ask you if

24 you remember; but if not, we'll take a look

25 at it.

Page 123

1 Do you know what the criteria

2 is for a gene to become part of these 273

3 genes that you report interact with

4 acetaminophen?

5 A. They're -- if they're listed as

6 changing an expression in the database or

7 physically interacting -- there are different

8 criteria in the database that are identified,

9 and you can specify what criteria you want to

10 use.

11 Q. It's changing any expression,

12 right, at all?

13 A. You can select whether it's up

14 or down or an interaction.

15 Q. And when you get to the page

16 where the 273 genes are listed, there's a

17 link where you can look at the backup for

18 that, right?

19 A. Yes, you can.

20 Q. Did you do that?

21 A. Yes, I did.

22 Q. Okay. Did you see that one of

23 the 273, the vast majority of them, were in

24 one study, one paper?

25 A. Generally, they derive from

Page 124

1 particular studies using expression data. So

2 a lot of it do come from individual studies.

3 Q. Okay. And did you look at

4 the -- did you know that, that

5 200-and-something of the 273 all come from

6 one study?

7 A. I was aware of that.

8 Q. Okay. And did you look at that

9 study?

10 A. I did.

11 Q. Okay. And did you see

12 acetaminophen in that study?

13 A. Might have to go back and look

14 at it specifically and what the different

15 exposures were.

16 Q. Okay. Is it your understanding

17 that that study that included more than 200

18 genes that are attributed here connected

19 acetaminophen and autism with those genes?

20 A. The -- this is a data risk

21 report in regards to those that were

22 associated with ASD and acetaminophen

23 exposure. So that is consistent with what I

24 found in the database.

25 MR. MURDICA: We'll mark this

Page 125

1 as Exhibit 4, please.

2 (Cabrera Exhibit 4 marked for

3 identification.)

4 QUESTIONS BY MR. MURDICA:

5 Q. Dr. Cabrera, you have in front

6 of you Exhibit 4, which is an article by

7 Santos.

8 Now, if you recall, this is the

9 one that's attributed -- to which is

10 attributed more than 200 of those genes. If

11 you need me -- if you don't remember that it

12 was Santos, I can show you how we got there.

13 A. I reference Santos in my --

14 Q. Okay.

15 A. -- in my report.

16 Q. Okay. So if you take a look at

17 this, could you show us where the

18 acetaminophen reference is here?

19 And did you actually look at

20 the -- did you pull this paper and look at

21 it --

22 A. Yes, I have.

23 Q. -- when you did your rebuttal

24 report?

25 A. Yes, I have.

<p>Page 126</p> <p>1 Yeah, so this describes the</p> <p>2 methodology that I used. It doesn't</p> <p>3 specifically indicate acetaminophen.</p> <p>4 Q. But your rebuttal report says</p> <p>5 acetaminophen?</p> <p>6 A. Yes, because I used</p> <p>7 acetaminophen and applied the methodology in</p> <p>8 this paper.</p> <p>9 Q. If we look through Exhibit 4</p> <p>10 and all the supplemental materials, we'll</p> <p>11 never see a mention of the word</p> <p>12 "acetaminophen." We'll never see the drug,</p> <p>13 the compound, correct?</p> <p>14 A. As I indicated, I used the</p> <p>15 methodology in this paper and put</p> <p>16 acetaminophen into the database and used the</p> <p>17 methodology that's described in this paper.</p> <p>18 Q. You signed your name to a</p> <p>19 report that says 273 genes are reported to</p> <p>20 interact with acetaminophen and ASD, correct?</p> <p>21 A. In the Comparative</p> <p>22 Toxicogenomics Database, yes.</p> <p>23 Q. Okay. And the backup for that,</p> <p>24 in that database, doesn't say the word</p> <p>25 "acetaminophen," correct?</p>	<p>Page 128</p> <p>1 A. That is correct.</p> <p>2 Q. Okay. And in the database, you</p> <p>3 see it says 273 genes, and then there's a</p> <p>4 little plus sign?</p> <p>5 A. I do see that, yes.</p> <p>6 Q. Okay. Did you click on that</p> <p>7 when you were in the database?</p> <p>8 A. Yes, I did.</p> <p>9 Q. Okay. And that's how you got</p> <p>10 to Santos, right?</p> <p>11 A. No. If you click on the</p> <p>12 references, which is two over, it indicates</p> <p>13 there are 35 references supporting those 273</p> <p>14 genes. And so if you click on those 273, you</p> <p>15 should see 35 references listed.</p> <p>16 MR. MURDICA: Can we mark this</p> <p>17 as Exhibit 6, please?</p> <p>18 (Cabrera Exhibit 6 marked for</p> <p>19 identification.)</p> <p>20 QUESTIONS BY MR. MURDICA:</p> <p>21 Q. Okay. Dr. Cabrera, you now</p> <p>22 have in front of you what's been marked as</p> <p>23 Exhibit 6.</p> <p>24 Do you recognize this?</p> <p>25 A. Yes, I do.</p>
<p>Page 127</p> <p>1 A. The database does say</p> <p>2 acetaminophen. If you query acetaminophen, I</p> <p>3 believe the second hit to come up is autism.</p> <p>4 Q. And, Dr. Cabrera, my question</p> <p>5 is different.</p> <p>6 The backup for that 273, when</p> <p>7 you -- in the database is this paper, right?</p> <p>8 A. It's not only this paper.</p> <p>9 (Cabrera Exhibit 5 marked for</p> <p>10 identification.)</p> <p>11 QUESTIONS BY MR. MURDICA:</p> <p>12 Q. Well, let's take a look. Can</p> <p>13 we mark that as Exhibit 5, please?</p> <p>14 Dr. Cabrera, you now have in</p> <p>15 front of you what's been marked as Exhibit 5.</p> <p>16 Do you have that in front of</p> <p>17 you?</p> <p>18 A. Yes, I do.</p> <p>19 Q. Okay. Does this look like the</p> <p>20 database that you queried online?</p> <p>21 A. It is a printout from the</p> <p>22 database.</p> <p>23 Q. Okay. And the second line is</p> <p>24 what you were talking about in this rebuttal</p> <p>25 report, correct?</p>	<p>Page 129</p> <p>1 Q. Okay. Is this what you would</p> <p>2 see if you click the link?</p> <p>3 A. Yes, it is.</p> <p>4 Q. Okay. The first reference is</p> <p>5 Santos, correct?</p> <p>6 A. Yes, it is.</p> <p>7 Q. Santos is the reference for 219</p> <p>8 of the 273 genes you're saying interact with</p> <p>9 acetaminophen in ASD, correct?</p> <p>10 A. That is correct.</p> <p>11 Q. So 219 of the 273, we looked at</p> <p>12 the article, has absolutely nothing to do</p> <p>13 with acetaminophen in the words on the page,</p> <p>14 correct?</p> <p>15 A. To be clear, it indicates</p> <p>16 xenobiotics, and it doesn't list all of the</p> <p>17 xenobiotics it analyzed in that publication.</p> <p>18 Q. Dr. Cabrera, Santos represents</p> <p>19 219 of the 273 gene interactions you're</p> <p>20 relying on in this statement in your rebuttal</p> <p>21 report, correct?</p> <p>22 A. It does.</p> <p>23 Q. Okay. And Santos does not</p> <p>24 contain the word "acetaminophen" anywhere in</p> <p>25 the paper or the supplemental materials as</p>

<p style="text-align: right;">Page 130</p> <p>1 far as you know, correct?</p> <p>2 A. As I indicated, it indicates</p> <p>3 that they've studied 397 gene environment</p> <p>4 interactions. And the database indicates</p> <p>5 that it's inferred and, therein, one of those</p> <p>6 gene interactions would be acetaminophen.</p> <p>7 Q. Okay. Was this page of the</p> <p>8 database peer reviewed, to your knowledge?</p> <p>9 A. Not that I'm aware.</p> <p>10 Q. And you have no proof, other</p> <p>11 than it says it's inferred in this database,</p> <p>12 that Santos actually stands for anything to</p> <p>13 do with acetaminophen, correct?</p> <p>14 A. Well, as I -- as I sit here not</p> <p>15 in front of the database, and I can't pull up</p> <p>16 the Santos data to show you, I would simply</p> <p>17 say there are 397 gene environmental</p> <p>18 interaction pairs that they looked at in</p> <p>19 Santos, and they don't list all 397 of them</p> <p>20 in the report.</p> <p>21 Q. Right.</p> <p>22 And, Dr. Cabrera, did you look</p> <p>23 at any of these other on Exhibit 6 here?</p> <p>24 A. Yes, I did.</p> <p>25 Q. You did? Okay.</p>	<p style="text-align: right;">Page 132</p> <p>1 None of them say</p> <p>2 "acetaminophen" in the data or the</p> <p>3 supplements.</p> <p>4 Do you disagree with that?</p> <p>5 A. G says "acetaminophen," and</p> <p>6 that I've reviewed that study previously, and</p> <p>7 it says "acetaminophen" specifically in that</p> <p>8 title and provides dose-responsive evidence</p> <p>9 of interactions with ADHD and ASD.</p> <p>10 Q. G is one of the human studies</p> <p>11 that we're going to -- well, it's the cord</p> <p>12 blood study we're going to be looking at</p> <p>13 that's throughout your report, correct?</p> <p>14 A. Yes, it is.</p> <p>15 Q. Okay. The others, every other</p> <p>16 one of these, did you pull them?</p> <p>17 A. I did look at them.</p> <p>18 Q. Okay. And you never saw the</p> <p>19 word "acetaminophen" in any of them, correct?</p> <p>20 A. Yeah, there -- they -- it's</p> <p>21 based on genetic interactions. That is,</p> <p>22 genes that have been associated with ASD that</p> <p>23 have been associated with exposures.</p> <p>24 Q. Right.</p> <p>25 But those papers don't actually</p>
<p style="text-align: right;">Page 131</p> <p>1 And did you find any that</p> <p>2 actually had the word "acetaminophen" in</p> <p>3 them?</p> <p>4 A. Yes, I did.</p> <p>5 Q. Okay. Do you know which ones?</p> <p>6 Well, let's -- how about we try the second</p> <p>7 one?</p> <p>8 A. Yes.</p> <p>9 Q. Have you looked at the second</p> <p>10 one, Doan, D-o-a-n?</p> <p>11 A. Well, all of them indicate,</p> <p>12 inferred, except for 3, which is G, and G</p> <p>13 indicates it's not an inferred. That's a</p> <p>14 mechanistic interaction.</p> <p>15 Q. Okay. So if we look at</p> <p>16 everything except reference 3, we're not</p> <p>17 going to find any reference to acetaminophen</p> <p>18 in the publications, correct?</p> <p>19 A. We'd have to look at them</p> <p>20 individually, but the -- but the inferred</p> <p>21 versus the mechanistic interactions are --</p> <p>22 typically it's based on database analysis of</p> <p>23 those interactions.</p> <p>24 Q. I mean, I have them all. We</p> <p>25 can look at them all.</p>	<p style="text-align: right;">Page 133</p> <p>1 stand for that proposition that the genes</p> <p>2 have been associated with acetaminophen and</p> <p>3 ADHD in the words that are on the page,</p> <p>4 correct?</p> <p>5 A. We would have to look at them</p> <p>6 individually. That being said, the database</p> <p>7 indicates that there's -- they're inferred</p> <p>8 interactions based on a gene in a given study</p> <p>9 or based on a number of genes depending on</p> <p>10 the study.</p> <p>11 (Cabrera Exhibit 7 marked for</p> <p>12 identification.)</p> <p>13 QUESTIONS BY MR. MURDICA:</p> <p>14 Q. Well, let's look at another one</p> <p>15 just so you feel comfortable that I'm</p> <p>16 representing it correctly to you. You have</p> <p>17 in front of you what's been marked as</p> <p>18 Exhibit 7.</p> <p>19 Do you see that, Dr. Cabrera?</p> <p>20 A. Yes, I do.</p> <p>21 Q. This is what is reference 2 on</p> <p>22 Exhibit 6, which is the reliance list for</p> <p>23 your 273 genes, correct?</p> <p>24 A. And what reference study is</p> <p>25 this?</p>

<p>Page 134</p> <p>1 Q. It's reference 2 on the exhibit 2 in front of you.</p> <p>3 A. Oh, I see, yes.</p> <p>4 Q. Do you agree?</p> <p>5 A. Yes.</p> <p>6 Q. Okay. And this is -- you're 7 counting this as six genes that, according to 8 you in your supplemental -- in your rebuttal 9 report, are genes that interact with 10 acetaminophen in ASD, right?</p> <p>11 A. To be clear, that's from the 12 database that there's -- it's inferred that 13 these six genes interact with acetaminophen.</p> <p>14 Q. You're relying on the database 15 that the database has it right, correct?</p> <p>16 A. I am.</p> <p>17 Q. Okay. Take the time if you 18 want to look through there. You're not going 19 to find acetaminophen, but when you're 20 comfortable that you can't find it, you let 21 us know.</p> <p>22 A. Okay. My reading of this is 23 that the genes that we reported in this 24 genome-wide association study are also genes 25 that have been reported to be changed in</p>	<p>Page 136</p> <p>1 expression data shows that there's changes in 2 genes, and those same genes are in this study 3 where there's an increased risk for autism.</p> <p>4 Q. And that's a supposition, 5 right? You didn't go and look at every gene 6 in the database, did you?</p> <p>7 A. I did not check all 273 genes.</p> <p>8 Q. You're relying on --</p> <p>9 A. I did look at them all, and I 10 did -- didn't do analysis on them, all of 11 them, but I -- you know, as I -- as I say 12 here, I couldn't -- I don't have the list in 13 front of me.</p> <p>14 Q. Okay. Did you look at the 15 methodology of how the database infers that 16 genes are related to something?</p> <p>17 A. Yes, just how I described here.</p> <p>18 Q. You looked at their stated 19 methodology on their -- in the database?</p> <p>20 A. Yes.</p> <p>21 Q. There's a page that says it, 22 right?</p> <p>23 A. Yes, there is.</p> <p>24 Q. And what it essentially does is 25 it combs the literature for any one of</p>
<p>Page 135</p> <p>1 expression with acetaminophen.</p> <p>2 Q. Okay. And it says that in 3 there?</p> <p>4 A. It doesn't mention 5 acetaminophen specifically, but in another 6 part of the database, you can look at the 7 specific gene interactions that are reported 8 that you don't -- you didn't present before 9 me.</p> <p>10 Q. And it's not -- so you're 11 saying it's not cited in the article, but 12 somehow that article still stands for the 13 proposition about acetaminophen?</p> <p>14 A. So the genes that are in this 15 article --</p> <p>16 Q. Yeah.</p> <p>17 A. -- are genes that are -- have 18 changes in regulations in response to 19 acetaminophen, and the genes that are 20 reported in this article are associated with 21 autism.</p> <p>22 Q. Okay. And the information 23 about their interaction with acetaminophen is 24 not coming from that article, correct?</p> <p>25 A. It's not, so that's -- the</p>	<p>Page 137</p> <p>1 200 words it -- that in any way correlate, 2 relate, associate, any gene to any compound, 3 exposure or outcome in any way, just in words 4 in the English language, correct?</p> <p>5 A. That is the query, but you can 6 also then query further and look for specific 7 interactions. So if you want to look at 8 genes that went up, you can actually look for 9 genes that went up.</p> <p>10 If you want to look for genes 11 that went down, you can look for specifically 12 genes that went down.</p> <p>13 If you want to look for 14 physical interactions, mechanistic 15 interactions, you can also look at 16 mechanistic interactions.</p> <p>17 Each one of those is an option 18 for the database.</p> <p>19 Q. This query that resulted in 20 273, however, was what I described; it was 21 not a more specific inquiry, correct?</p> <p>22 A. Yes, it was the general 23 analysis of interactions.</p> <p>24 Q. Okay. Now, throughout this 25 rebuttal report that we marked as Exhibit 2,</p>

<p style="text-align: right;">Page 138</p> <p>1 I believe, you criticized -- most of it is 2 spent criticizing the analysis of Dr. Chung, 3 correct? 4 A. That is correct. 5 Q. And you understand Dr. Chung 6 has offered an opinion here that for ASD and 7 ADHD, the predominant cause in any human 8 being is genetics, correct? 9 A. That's my understanding. 10 Q. And you, Dr. Cabrera, disagree 11 with that, right? 12 A. The principles of teratology 13 indicate that it's genes and environment, 14 that any exposure that can produce an outcome 15 can be modified by the genotype or the 16 background of that exposure. 17 Q. There are human beings with 18 autism and ADHD that have those conditions 19 100 percent because of a genetic mutation, 20 correct? 21 A. They're all -- there are some 22 genes that are what is referred to as 23 necessary and sufficient to cause autism or 24 autism behaviors in people with those 25 mutations, that it's part of the different</p>	<p style="text-align: right;">Page 140</p> <p>1 genetic, correct? 2 A. There -- it's been shown that 3 they're -- they have a stronger genetic 4 interaction or a stronger likelihood of being 5 caused by genetics. 6 Q. And did you look at Dr. Chung's 7 qualifications prior to criticizing her in 8 your rebuttal report? 9 A. Yes, I did. 10 Q. Okay. And you don't have any 11 of the qualifications that she has, correct? 12 A. I don't have her same 13 qualifications. 14 Q. Right. 15 No board certifications in 16 genetics, correct? 17 A. I'm not boarded in genetics. 18 Q. Okay. Right. 19 None of the degrees or 20 accomplishments that she has publicly in 21 genetics are held by Dr. Cabrera, correct? 22 A. I don't have the same accolades 23 as her, if you will. 24 Q. Okay. And you do know that 25 Dr. Chung's opinions that she's rendered here</p>
<p style="text-align: right;">Page 139</p> <p>1 types of genes that interact. 2 As I mentioned earlier, it's 3 oligogenic, some genes that are necessary and 4 sufficient in themselves to cause autism, and 5 there's also the polygenic and those that can 6 modify risk with interactions between 7 gene-gene interactions and gene-environment 8 interactions. 9 Q. And, in fact, in your -- in 10 Exhibit 2, your rebuttal report, you 11 criticize Dr. Chung in that you say she 12 relies on -- primarily on the most severe 13 versions of autism and ADHD in her data, 14 correct? 15 A. To be clear, I was pointing out 16 the exclusion of literature in regards to a 17 clinical diagnosis of autism based on the 18 current guidelines as opposed to some other 19 measures of parameters consistent with autism 20 or consistent with ADHD, that excluding those 21 is one way to strengthen a genetic 22 interaction. 23 Q. And the implication, is it not, 24 is that you think the more severe versions of 25 autism and ASD are -- autism and ADHD are</p>	<p style="text-align: right;">Page 141</p> <p>1 are consistent with all of the medical 2 organizations that have looked at this, 3 correct? 4 A. I disagree -- 5 MR. TRACEY: Objection to form. 6 THE WITNESS: -- inasmuch as 7 Dr. -- Dr. Chung's opinions aren't 8 consistent with Dr. Chung inasmuch as 9 her own presentations and her work 10 outside of defense work. 11 QUESTIONS BY MR. MURDICA: 12 Q. I know you -- I know you -- 13 well, I'm not going to argue with you about 14 that. 15 Have you seen what the medical 16 organizations have said about acetaminophen 17 and whether or not they relate to autism and 18 ADHD? 19 MR. TRACEY: Objection. Form. 20 THE WITNESS: Collectively, my 21 understanding is they're still under 22 review by the FDA. 23 Outside of that, I'm -- you 24 know, unless you're speaking to a 25 specific medical organization, I can't</p>

Page 142

1 comment.

2 QUESTIONS BY MR. MURDICA:

3 Q. Sure.

4 How about -- well, let's talk

5 about in your field.

6 Did you see what OTIS said

7 about this?

8 A. I have, yes.

9 Q. They disagree with you,

10 correct?

11 A. Apparently.

12 Q. Not apparently, they do,

13 correct? You've seen it?

14 A. I've seen it.

15 Q. Yeah.

16 And it's not just -- OTIS is

17 more than one person, correct?

18 A. It's a group.

19 Q. It's a group, and the whole

20 group disagrees with you, correct?

21 A. I don't know that the whole

22 group does. I didn't --

23 Q. Well, as a group --

24 A. I can't -- I can't say that.

25 Q. As a group, they disagree with

Page 143

1 you, correct?

2 A. OTIS did put out a position

3 piece, and I don't know that it was OTIS in

4 its entirety, but OTIS did put out a position

5 piece to that effect.

6 Q. And what does OTIS stand for?

7 A. It's the --

8 Q. Is the "T" teratology?

9 A. Yes, Obstetrics, Teratology

10 Information Society {sic}, I believe.

11 Q. Okay. MotherToBaby?

12 A. It's part of it.

13 Q. Okay. And FDA disagrees with

14 you, correct?

15 A. My understanding is FDA is

16 still reviewing the information.

17 Q. Well, have you looked at what

18 they've said?

19 A. Recently as -- 2015 was the

20 recent opinions that they offered, but that

21 was -- there's been quite a bit of data since

22 then.

23 Q. Okay. Dr. Cabrera, didn't you

24 look at documents produced by the FDA in the

25 litigation?

Page 144

1 A. Yes, I have.

2 Q. Aren't those more recent than

3 2015?

4 A. Oh, yes.

5 Q. They're as recent as 2022,

6 correct?

7 A. Yes.

8 Q. And the conclusion that they

9 have and the reason why nothing has changed

10 with respect to acetaminophen is because they

11 disagree with you, correct?

12 MR. TRACEY: Object to form.

13 This is not a re -- {inaudible} --

14 deposition.

15 THE WITNESS: Yeah. I don't

16 agree with that. I think it's still

17 under review at the FDA. That's my

18 understanding.

19 QUESTIONS BY MR. MURDICA:

20 Q. Okay. They have not come to

21 the conclusions, publicly or privately, as

22 far as we know, based on the documents you

23 reviewed that you have, correct?

24 A. I have not seen --

25 MR. TRACEY: Object -- object

Page 145

1 to the form.

2 THE WITNESS: Yeah, I have not

3 seen that -- a public opinion that has

4 changed since the 2015 statement by

5 the FDA.

6 QUESTIONS BY MR. MURDICA:

7 Q. You have not seen a public

8 opinion or documents that are consistent with

9 your opinion here, correct, from FDA?

10 A. I have not seen that from the

11 FDA publicly or in their other documents,

12 other than the fact it's still under review.

13 Q. And did you see what FDA said

14 about this as recently as last month?

15 A. There was a statement last

16 month. I'm not sure I've seen that

17 statement.

18 Q. Okay. I'll show you in a

19 minute, in the interest of moving this along.

20 I asked you about OTIS and FDA.

21 Did you look at what ACOG has

22 said?

23 A. I'm familiar with the ACOG

24 rebuttal statement.

25 Q. Right.

Page 146

1 Okay. So you know they
2 disagree with your position here as well,
3 right?
4 A. Consistent with the rebuttal
5 statement, I'm familiar with that.
6 Q. Okay. And same with the
7 Society for Maternal-Fetal Medicine, right?
8 A. I haven't seen the statement
9 for Society for Maternal and Fetal Medicine.
10 Q. Okay. Well, let me ask it this
11 way. Have you seen any medical organization
12 that agrees with you -- that agrees with your
13 opinions here, Dr. Cabrera, as it relates to
14 acetaminophen and autism and ADHD?
15 A. I have not seen a statement
16 from a medical organization, no --
17 Q. Are you --
18 A. -- in that regard.
19 Q. -- concerned by helping the
20 plaintiffs here you're contributing to a
21 public health crisis?
22 A. To be clear --
23 MR. TRACEY: Objection. Form.
24 THE WITNESS: To be clear, I'm
25 not -- there is -- there is a public

Page 147

1 health concern for safety, and that's
2 the lack of warning on the label.
3 QUESTIONS BY MR. MURDICA:
4 Q. You're not concerned that by
5 being a part of a lawyer movement to scare
6 pregnant women about the use of acetaminophen
7 that you can harm them --
8 MR. TRACEY: Robert, Robert,
9 don't answer that question. It's
10 nonsensical. It's argumentative, and
11 it's outrageous for a scientific
12 deposition.
13 If you want to ask a question
14 grounded in science, that's relevant
15 to general causation, do it. If you
16 want to make speeches, go out on the
17 street.
18 MR. MURDICA: Okay. Well, my
19 response to that is that he's offering
20 labeling opinions in his -- in his
21 report, Sean. I could cite the pages
22 to you, but there's several pages on
23 it, so...
24 He also, Sean, just testified
25 that there is a public health concern,

Page 148

1 so I'll come back to that in a minute.
2 MR. TRACEY: It was -- it was
3 the way you asked your question loaded
4 with all sorts of arguments that were
5 probably created within the confines
6 of your firm or Johnson & Johnson.
7 Ground your questions in
8 something factual.
9 MR. MURDICA: Sure.
10 QUESTIONS BY MR. MURDICA:
11 Q. Dr. Cabrera, earlier we talked
12 about the thimerosal literature and the
13 events surrounding thimerosal and the concern
14 for autism.
15 Do you recall that?
16 A. Yes, I do.
17 Q. There was a public health issue
18 with thimerosal that caused children to not
19 be vaccinated because of a scare of autism in
20 the vaccine, correct?
21 A. I'm familiar with that idea. I
22 don't know about that endpoint.
23 Q. Okay. And that ended up being
24 not true. I think we talked about that
25 earlier, or at least the data has not proven

Page 149

1 it, correct?
2 A. Fair enough.
3 Q. And you know, as a human being
4 in society, that that has had long-term
5 consequences where some people don't want to
6 vaccinate their children, correct?
7 A. I'm aware that that has created
8 some vaccine hesitancy in the population.
9 Q. So my question is, as a
10 researcher at an institution like Baylor, are
11 you not concerned that you are causing
12 thimerosal part 2 by rendering an opinion
13 like you are here?
14 A. So there are potential public
15 health impacts in that regard. I am aware of
16 that.
17 MR. MURDICA: Okay. Let's mark
18 this as Exhibit 8.
19 (Cabrera Exhibit 8 marked for
20 identification.)
21 QUESTIONS BY MR. MURDICA:
22 Q. Dr. Cabrera, you have in front
23 of you Exhibit 8, and I just asked you about
24 whether you had seen a recent FDA statement
25 on this topic. You seemed unfamiliar with

Page 150

1 it.

2 Have you seen this before?

3 A. I can't say that I have.

4 MR. WATTS: What's the date on

5 it, Jim?

6 MR. MURDICA: It's July 10,

7 2023.

8 MR. WATTS: Thanks.

9 QUESTIONS BY MR. MURDICA:

10 Q. Doctor, if you turn to --

11 unfortunately, the pages aren't numbered. I

12 will -- let me help.

13 And feel free, you can read

14 anything you want. My question is going to

15 be about this paragraph.

16 A. If we could take a break so I

17 can actually read this and do a bio break.

18 MR. MURDICA: Totally fine.

19 Yeah. Yeah.

20 MS. KING: Can we go off the

21 record?

22 MR. MURDICA: Yeah. We'll go

23 off the record.

24 VIDEOGRAPHER: Off the record,

25 11:25.

Page 151

1 (Off the record at 11:25 a.m.)

2 VIDEOGRAPHER: The time is

3 11:43, back on the record, beginning

4 of Media 3.

5 QUESTIONS BY MR. MURDICA:

6 Q. Dr. Cabrera, are you ready to

7 proceed?

8 A. Yes.

9 Q. Okay. I had asked you a

10 question before we took a break. I can ask

11 it again, but in the meantime, did you have a

12 chance to review what's been marked as

13 Exhibit 8?

14 A. Yes, I did.

15 Q. Okay. And my question for you

16 was about -- you see it's dated July 10,

17 2023?

18 A. Yes, I do.

19 Q. Okay. And in it, it is a -- a

20 reporter is attributing to FDA Press Officer

21 Charlie Kohler an e-mail where FDA has said,

22 "'While the agency continues to monitor the

23 issue, it closed the formal tracking process

24 in 2020,' said Kohler, because extensive

25 reviews failed to turn up solid evidence of

Page 152

1 the link between the drug and

2 neurodevelopment issues."

3 Do you see that?

4 A. One second here.

5 Q. Do you want me to give you the

6 page?

7 It's before that. Oh, no --

8 A. This one here?

9 Q. Yep.

10 A. Okay.

11 Q. You have it flagged, I think.

12 A. Yeah. Okay. Yes.

13 Q. Okay. You saw that when you

14 reviewed it --

15 A. Yes, I did.

16 Q. -- during the break, right?

17 Did you know before today that

18 as recently as July 10th of 2023, the FDA

19 made such a statement?

20 A. I see that this press officer

21 has made this in this article. I hadn't seen

22 this article previously.

23 Q. Okay.

24 A. So I was unaware of both this

25 article and that statement.

Page 153

1 Q. Okay. And the statement here

2 by an FDA press officer less than a month ago

3 disagrees with the opinions you've rendered

4 in this litigation, correct?

5 A. Well, what it indicates is, as

6 you -- as you've read, according to this

7 press officer, that the formal tracking

8 processes in 2020 closed, and that they

9 failed to turn up solid evidence of a link

10 between the drug and neurodevelopmental

11 issues. And I do disagree with that

12 statement.

13 Q. Right.

14 Because you believe you turned

15 up a solid evidence of a link between

16 acetaminophen and neurodevelopmental issues,

17 correct?

18 A. Because there is solid evidence

19 of that.

20 Q. As of when -- Dr. Cabrera, as

21 of what date, based on your review, is there

22 solid evidence of a link between

23 acetaminophen and neurodevelopmental issues?

24 A. I would say there's been

25 growing evidence since at least 2015.

<p>Page 154</p> <p>1 Q. Okay. Since FDA first said --</p> <p>2 you referred to earlier in response to a</p> <p>3 question of mine that you were aware of an</p> <p>4 FDA statement in 2015, correct?</p> <p>5 A. Yes.</p> <p>6 Q. And we're both talking about</p> <p>7 the same thing. It's what you can find on</p> <p>8 FDA's website that says while there have been</p> <p>9 these studies, there's no reason to change</p> <p>10 current guidance for how acetaminophen is</p> <p>11 used, correct?</p> <p>12 A. That is correct.</p> <p>13 Q. Okay. And you're saying right</p> <p>14 about then is when there was a solid link</p> <p>15 between acetaminophen and neurodevelopmental</p> <p>16 issues?</p> <p>17 A. I'm saying there's been growing</p> <p>18 evidence since then in support of a causative</p> <p>19 interaction between acetaminophen and</p> <p>20 neurodevelopmental issues.</p> <p>21 Q. Right.</p> <p>22 And at what point -- is it</p> <p>23 2015 -- what was available as of 2015 would</p> <p>24 have led you to the conclusion that it causes</p> <p>25 ASD and ADHD?</p>	<p>Page 156</p> <p>1 should have changed. But I can tell you that</p> <p>2 the reference textbook, which is considered</p> <p>3 essential for education in the health</p> <p>4 sciences, indicates that that label</p> <p>5 changed -- or their labeling of acetaminophen</p> <p>6 changed in 2015.</p> <p>7 Q. And which reference textbook is</p> <p>8 that?</p> <p>9 A. That's Briggs.</p> <p>10 Q. Briggs.</p> <p>11 And was that with respect to</p> <p>12 ADHD and ASD or just ADHD?</p> <p>13 A. Initially, it is with ADHD, but</p> <p>14 it also includes other neurodevelopmental</p> <p>15 disorders.</p> <p>16 Q. And when was that?</p> <p>17 A. That started in 2015.</p> <p>18 Q. Okay. So in 2015, it included</p> <p>19 autism in Briggs?</p> <p>20 A. It didn't include autism</p> <p>21 initially. It was ADHD initially.</p> <p>22 Q. And that is -- Briggs is a</p> <p>23 textbook that you used?</p> <p>24 A. It is a textbook that I -- that</p> <p>25 I reference.</p>
<p>Page 155</p> <p>1 A. I would say the authoritative</p> <p>2 reference in Maternal and Fetal Medicine</p> <p>3 changed its warning about acetaminophen in</p> <p>4 2015. So that would be consistent with the</p> <p>5 growing evidence, and that's the same warning</p> <p>6 that it still carries to this day.</p> <p>7 Q. Well, I'm asking about your</p> <p>8 opinions, Dr. Cabrera.</p> <p>9 Based on your review, because</p> <p>10 you looked at -- we're going to go into all</p> <p>11 the stuff that you looked at over lunch, but</p> <p>12 you looked at articles from the 1980s, right,</p> <p>13 the 1990s, 2000s? You looked at -- you</p> <p>14 handed me today something from two days ago,</p> <p>15 right?</p> <p>16 A. (Witness nods head.)</p> <p>17 Q. At what point in time,</p> <p>18 according to Dr. Cabrera, was there enough</p> <p>19 evidence to believe that there was a causal</p> <p>20 relationship between acetaminophen and ADHD</p> <p>21 and ASD?</p> <p>22 A. I would have difficulty</p> <p>23 retrospectively telling you as someone that</p> <p>24 wasn't following it longitudinally to tell</p> <p>25 you when the exact time that these things</p>	<p>Page 157</p> <p>1 Q. Okay. And do you know what</p> <p>2 Briggs did to come to that conclusion?</p> <p>3 A. They conducted an analysis of</p> <p>4 the literature.</p> <p>5 Q. And they said that it's causal?</p> <p>6 A. They made a pregnancy summary</p> <p>7 specific to that in 2015 and highlighted it</p> <p>8 as a fetal risk summary and then described</p> <p>9 the literature in that regard. And it</p> <p>10 changed from being compatible with pregnancy</p> <p>11 to human data suggests low risk and fetal</p> <p>12 risk and then described the summary of that</p> <p>13 risk.</p> <p>14 Q. Okay. And is Briggs something</p> <p>15 that you use to make your causation</p> <p>16 determination, or did you do that</p> <p>17 independently?</p> <p>18 A. I looked because I -- as I</p> <p>19 mentioned previously, I do have a specialist</p> <p>20 in maternal-fetal medicine, and she said to</p> <p>21 look at it in the book and see what they</p> <p>22 said. Like, that would be what would be the</p> <p>23 current guidance for actual medical</p> <p>24 professionals. And so that's what I looked.</p> <p>25 This is what they get educated with.</p>

<p style="text-align: right;">Page 158</p> <p>1 Q. Right.</p> <p>2 Medical professionals which you</p> <p>3 are not, correct?</p> <p>4 A. I am not a medical</p> <p>5 professional.</p> <p>6 Q. And in your work in teratology,</p> <p>7 had you ever looked at Briggs before?</p> <p>8 A. I've looked up things in Briggs</p> <p>9 before, yes.</p> <p>10 Q. Okay. Is that a reference</p> <p>11 textbook you use in teratology?</p> <p>12 A. For looking up compounds, you</p> <p>13 can, absolutely. It's online, so it's easy</p> <p>14 to access.</p> <p>15 Q. Yeah.</p> <p>16 I'm saying in your work, is</p> <p>17 Briggs a standard reference for you as a</p> <p>18 teratologist and has been?</p> <p>19 A. Yes, specific for human</p> <p>20 exposures because they tend to focus more on</p> <p>21 what's the clinical recommendations in</p> <p>22 regards to patients.</p> <p>23 Q. Okay. So Dr. Cabrera, for his</p> <p>24 opinions here, is relying on Briggs summary</p> <p>25 of articles in 2015, correct?</p>	<p style="text-align: right;">Page 160</p> <p>1 Q. And nothing in Briggs says</p> <p>2 that, 2015 or now, that acetaminophen causes</p> <p>3 ADHD, correct?</p> <p>4 A. The pregnancy summary</p> <p>5 indicates, "Although the risk is very low,</p> <p>6 use of the drug for several weeks or longer</p> <p>7 has been associated with cryptorchidism,</p> <p>8 decreased IQ, ADHD and other problems in</p> <p>9 neurodevelopment." And "other problems" are</p> <p>10 largely referenced. Some of them overlap</p> <p>11 with autism and including intellectual</p> <p>12 disability.</p> <p>13 Q. Okay. And so back to my</p> <p>14 question.</p> <p>15 Whether it be in 2015 or today,</p> <p>16 Briggs does not say that acetaminophen causes</p> <p>17 ADHD or autism, correct?</p> <p>18 A. It says that it has been</p> <p>19 associated with and that short-term use</p> <p>20 suggests low risk, long-term use suggests</p> <p>21 risk of, as I just mentioned, cryptorchidism,</p> <p>22 decreased IQ, ADHD and other problems in</p> <p>23 neurodevelopment.</p> <p>24 Q. Okay. Is there a difference</p> <p>25 between association and causation,</p>
<p style="text-align: right;">Page 159</p> <p>1 A. I included it as part of the</p> <p>2 data, their review as well.</p> <p>3 Q. Right.</p> <p>4 And that is an underlying part</p> <p>5 of your causation opinion, to rely on their</p> <p>6 review of articles from 2015, correct?</p> <p>7 A. I did review their work as well</p> <p>8 as part of the literature that I looked at.</p> <p>9 Q. Okay. I just want to be clear.</p> <p>10 As part of your causation</p> <p>11 opinion here, you are relying on Briggs' own</p> <p>12 review of the literature in 2015, correct?</p> <p>13 A. I'm simply referencing them as</p> <p>14 authoritative texts. Authoritative texts are</p> <p>15 not part of causation. So that's not part of</p> <p>16 the causation analysis, but it was part of</p> <p>17 the analysis I conducted --</p> <p>18 Q. Okay.</p> <p>19 A. -- in regards to background.</p> <p>20 Q. Right.</p> <p>21 Because you can look at the</p> <p>22 articles yourself. You don't need to rely on</p> <p>23 Briggs' interpretation to come up with your</p> <p>24 interpretation, correct?</p> <p>25 A. That is correct.</p>	<p style="text-align: right;">Page 161</p> <p>1 Dr. Cabrera?</p> <p>2 A. There is.</p> <p>3 Q. Okay. And association is not</p> <p>4 causation, correct?</p> <p>5 A. That is correct.</p> <p>6 Q. Your opinion here is that</p> <p>7 acetaminophen causes ADHD, correct?</p> <p>8 A. That is correct.</p> <p>9 Q. Your opinion here is that</p> <p>10 acetaminophen causes autism, correct?</p> <p>11 A. That is correct.</p> <p>12 Q. Briggs, whether it be in 2015</p> <p>13 or now, does not say that acetaminophen</p> <p>14 causes ADHD or autism, correct?</p> <p>15 A. It's not a causation analysis.</p> <p>16 Q. Okay. Thank you.</p> <p>17 Now, let's talk about some</p> <p>18 other things that you considered and --</p> <p>19 because I want to know if they're a part of</p> <p>20 your causation opinion or just things that</p> <p>21 you considered.</p> <p>22 I saw on your reliance list</p> <p>23 that you looked at documents from the</p> <p>24 manufacturer of Tylenol.</p> <p>25 Is that right?</p>

<p style="text-align: right;">Page 162</p> <p>1 A. Yes.</p> <p>2 Q. Okay. And that was your idea,</p> <p>3 right?</p> <p>4 A. I asked for documents in</p> <p>5 regards to preclinical studies.</p> <p>6 Q. Okay. And how do you know that</p> <p>7 you got everything that was available?</p> <p>8 A. I don't know that for a fact.</p> <p>9 Q. Okay. So did you ask anyone</p> <p>10 how many pages or how many documents were</p> <p>11 produced in litigation with respect to</p> <p>12 Tylenol?</p> <p>13 A. I haven't asked that.</p> <p>14 Q. Okay. Do you know how many</p> <p>15 pages you did get?</p> <p>16 A. I -- all the pages I did get</p> <p>17 are in my work cited or my reliance list.</p> <p>18 Outside of that, I -- I probably haven't seen</p> <p>19 it, if it's not in my reliance.</p> <p>20 Q. Okay. So before I ask you any</p> <p>21 questions about them, are these things like</p> <p>22 Briggs that you considered but they aren't</p> <p>23 part of your causation opinion, or are they</p> <p>24 part of your causation opinion?</p> <p>25 A. Things that I considered.</p>	<p style="text-align: right;">Page 164</p> <p>1 Here, when you're looking at</p> <p>2 acetaminophen and whether it can cause ADHD</p> <p>3 or autism, is -- do you agree with me that we</p> <p>4 don't have the quality of data that would be</p> <p>5 the equivalent of the NAAED we were talking</p> <p>6 about earlier? In other words, a pregnancy</p> <p>7 registry double-blinded in humans?</p> <p>8 A. It's two questions. Which one</p> <p>9 do you want me to answer?</p> <p>10 Q. Okay. Here --</p> <p>11 MR. TRACEY: Objection.</p> <p>12 Compound.</p> <p>13 MR. MURDICA: You cheated. He</p> <p>14 gave you that one.</p> <p>15 MR. WATTS: Objection. The</p> <p>16 witness is leading Mr. Tracey.</p> <p>17 QUESTIONS BY MR. MURDICA:</p> <p>18 Q. Dr. Cabrera, with respect to</p> <p>19 the data available for acetaminophen exposure</p> <p>20 in utero, does a pregnancy -- a</p> <p>21 double-blinded pregnancy registry exist?</p> <p>22 A. Yes.</p> <p>23 Oh, no, no. For acetaminophen,</p> <p>24 no.</p> <p>25 Q. Okay. And so we don't have</p>
<p style="text-align: right;">Page 163</p> <p>1 They're not part of a causation analysis.</p> <p>2 Q. Okay. And in your normal work,</p> <p>3 you're looking at science, not at company</p> <p>4 e-mails or anything like that, correct?</p> <p>5 A. That is correct.</p> <p>6 Q. Company e-mails and deposition</p> <p>7 transcripts don't really elucidate the data</p> <p>8 that you're considering for causation,</p> <p>9 correct?</p> <p>10 A. That's generally outside the</p> <p>11 scope of -- other than e-mails within Baylor,</p> <p>12 as an institution, I wouldn't normally look</p> <p>13 at institutions from -- e-mails from other</p> <p>14 institutions.</p> <p>15 Q. Okay.</p> <p>16 A. Or other companies.</p> <p>17 Q. All right. Before we break for</p> <p>18 lunch, I just want to go back to some of the</p> <p>19 questions I had for you earlier regarding</p> <p>20 pregnancy -- we talked about a pregnancy</p> <p>21 registry.</p> <p>22 Do you remember that?</p> <p>23 A. Yes.</p> <p>24 Q. I just want to talk to you</p> <p>25 briefly about hierarchy of evidence.</p>	<p style="text-align: right;">Page 165</p> <p>1 prospective, double-blinded human pregnancy</p> <p>2 data with respect to acetaminophen, correct?</p> <p>3 A. Not that I'm aware.</p> <p>4 Q. Okay. And in the hierarchy of</p> <p>5 evidence, that would be really high if we had</p> <p>6 it, correct?</p> <p>7 A. In the hierarchy of evidence, I</p> <p>8 would -- I would put that just below</p> <p>9 meta-analysis.</p> <p>10 Q. Okay. And below that, what do</p> <p>11 we have?</p> <p>12 A. Well, any prospective studies</p> <p>13 and then retrospective studies.</p> <p>14 Q. Okay. And there's very --</p> <p>15 there's differences in prospective studies,</p> <p>16 right? Some are a higher quality than</p> <p>17 others, right?</p> <p>18 A. There can be, yes.</p> <p>19 Q. Okay. And whether they're</p> <p>20 controlled or not, correct, makes a</p> <p>21 difference?</p> <p>22 A. Yes.</p> <p>23 Q. Do you agree?</p> <p>24 Clinical trials, for example,</p> <p>25 would be high up on the scale of evidence,</p>

<p style="text-align: right;">Page 166</p> <p>1 right?</p> <p>2 A. Well, clinical trials would</p> <p>3 normally fall in double-blind, you know,</p> <p>4 studies. So those would be high.</p> <p>5 Q. And generally, in the United</p> <p>6 States, as an ethical matter, we don't</p> <p>7 intentionally test drugs on pregnant people,</p> <p>8 correct?</p> <p>9 A. Yeah. To be clear, I think</p> <p>10 that's fairly global, that we don't include</p> <p>11 pregnant women in drug testing.</p> <p>12 MR. MURDICA: Okay. All right.</p> <p>13 I'll get into this stuff after lunch</p> <p>14 so that the food doesn't get cold.</p> <p>15 All right. Thanks. I don't want</p> <p>16 anybody getting mad.</p> <p>17 VIDEOGRAPHER: Off the record?</p> <p>18 MR. MURDICA: Yeah. We'll go</p> <p>19 off the record.</p> <p>20 MR. TRACEY: How long is the</p> <p>21 lunch break?</p> <p>22 VIDEOGRAPHER: Off the record,</p> <p>23 11:59.</p> <p>24 (Off the record at 11:59 a.m.)</p> <p>25 VIDEOGRAPHER: The time is</p>	<p style="text-align: right;">Page 168</p> <p>1 A. It's -- relatively speaking,</p> <p>2 it's about --</p> <p>3 MR. TRACEY: Hold on, Robert.</p> <p>4 You don't have to answer personal</p> <p>5 financial information about how much</p> <p>6 money you make. That's not relevant.</p> <p>7 MR. MURDICA: It does go to</p> <p>8 bias, if it's 100 percent of what he</p> <p>9 makes, Sean.</p> <p>10 MR. TRACEY: Are you going to</p> <p>11 let me ask all your witnesses how much</p> <p>12 their salary is at their places of</p> <p>13 employment?</p> <p>14 MR. MURDICA: I'm not asking</p> <p>15 his salary. I didn't ask his salary.</p> <p>16 I just asked how it compared to what</p> <p>17 he's being paid. Could be</p> <p>18 significant, could be insignificant.</p> <p>19 I didn't -- I didn't tell him how to</p> <p>20 answer it.</p> <p>21 MR. TRACEY: Well, I know, but</p> <p>22 you left -- that question is</p> <p>23 open-ended. I don't know how else</p> <p>24 any, you know, nonnormal lawyer would</p> <p>25 answer that.</p>
<p style="text-align: right;">Page 167</p> <p>1 12:48 p.m., back on the record,</p> <p>2 beginning of Media 4.</p> <p>3 QUESTIONS BY MR. MURDICA:</p> <p>4 Q. Welcome back from lunch,</p> <p>5 Dr. Cabrera.</p> <p>6 Are you ready to proceed?</p> <p>7 A. Yes, I am.</p> <p>8 Q. Okay. All right. We're going</p> <p>9 to get back into it with some easy ones.</p> <p>10 I think you acknowledged</p> <p>11 earlier that you're being paid for your time</p> <p>12 here by plaintiffs' lawyers, correct?</p> <p>13 A. Yes, I am.</p> <p>14 Q. And what's your hourly rate?</p> <p>15 A. 500.</p> <p>16 Q. Okay. And how much have you</p> <p>17 charged them so far in this litigation,</p> <p>18 ballpark?</p> <p>19 A. I think I had about 200 hours</p> <p>20 or so. Maybe just over 200 hours.</p> <p>21 Q. So over \$100,000, thereabouts?</p> <p>22 A. Approximately, yes.</p> <p>23 Q. Okay. And how does that</p> <p>24 compare to your -- whatever you get paid by</p> <p>25 Baylor or your lab?</p>	<p style="text-align: right;">Page 169</p> <p>1 MR. MURDICA: If I didn't ask</p> <p>2 it open-ended, you'd object.</p> <p>3 MR. TRACEY: Well, try me and</p> <p>4 see.</p> <p>5 MR. WATTS: Are we going to ask</p> <p>6 about money at every deposition, or do</p> <p>7 you want to not do it? I don't care.</p> <p>8 You decide.</p> <p>9 MR. MURDICA: I'll pass.</p> <p>10 QUESTIONS BY MR. MURDICA:</p> <p>11 Q. Okay. One of the principles of</p> <p>12 teratology is to consider all evidence when</p> <p>13 you're trying to make a causation</p> <p>14 determination, correct?</p> <p>15 A. The totality of evidence, yes.</p> <p>16 Q. Okay. Do you feel that you</p> <p>17 followed that here?</p> <p>18 A. Yes.</p> <p>19 Q. Okay. So there's nothing you</p> <p>20 intentionally didn't consider, correct?</p> <p>21 A. Not intentionally.</p> <p>22 Q. Okay. In your -- you have</p> <p>23 access to your lab that you were talking</p> <p>24 about earlier, right?</p> <p>25 A. That's correct.</p>

Page 170

1 Q. And in your regular work,
 2 you -- your primary work, you conduct rodent
 3 tests, right?
 4 A. We do three things in my
 5 laboratory that is both genetics, and that
 6 includes human and animal genetics.
 7 And so we have a human genetic
 8 side, and we make mouse models of human
 9 disease, we refer to that as the mouse side.
 10 And then we also do tissue culture and
 11 produce cellular models of diseases. And
 12 that's -- by and large, it's turned into stem
 13 cell cultures. So we make -- induce
 14 pluripotent stem cells, and we do embryo
 15 cultures or neural cultures.
 16 Q. So you work with cells?
 17 A. Yes.
 18 Q. And you work with rodents, and
 19 you do process or -- do you do genetic
 20 testing there, or do you send it out?
 21 A. For clinical testing, that gets
 22 sent to Baylor Genetics. For research
 23 purposes, we do -- we do research.
 24 Q. Okay. And when you were asked
 25 to look into acetaminophen here, did you

Page 171

1 conduct any tests in your lab?
 2 A. I have not.
 3 Q. Okay. You didn't conduct any
 4 cellular tests?
 5 A. To be clear, that would be a
 6 conflict of interest if I was doing tests
 7 with acetaminophen while I was being paid. I
 8 would have to file that as a conflict of
 9 interest with Baylor.
 10 Q. Okay. Can you explain that to
 11 me? I don't really understand how that's a
 12 conflict of interest.
 13 A. Because I'm being paid, in
 14 order to do research at Baylor with the
 15 resources that I -- that I have, I would have
 16 to file that with Baylor; that I would be
 17 using my resources to do research --
 18 Q. I see.
 19 You can't use your lab to do
 20 outside research; is that what you're saying?
 21 A. To do my personal research.
 22 Q. Okay. You could have used your
 23 expertise to borrow a lab or rent a lab and
 24 done acetaminophen research, correct?
 25 A. That would be a possibility.

Page 172

1 Q. Okay. And you didn't do that,
 2 right?
 3 A. I have not.
 4 Q. Okay.
 5 A. Well, not in this case, no.
 6 Q. Do you anticipate doing that in
 7 this case, sitting here today?
 8 A. That is not something I planned
 9 on doing.
 10 Q. Okay. Have you looked at the
 11 records of any person in relation to this
 12 litigation, any human being?
 13 A. Case-specific?
 14 Q. Yes.
 15 A. I have not looked at any
 16 case-specific.
 17 Q. Okay. By the way, earlier you
 18 said that somebody told you to look at
 19 Briggs, and we talked about that for a while.
 20 A. (Witness nods head.)
 21 Q. Who is the person who told you
 22 to look at Briggs?
 23 A. One of the people in our group.
 24 Her name's Jackie Parchem.
 25 Q. Okay. And what's her

Page 173

1 specialty?
 2 A. She's maternal-fetal health.
 3 She's an -- she's an obstetrician,
 4 gynecologist.
 5 Q. And can you -- I didn't hear
 6 the last name. Jackie?
 7 A. Parchem.
 8 Q. Parchem?
 9 A. Yeah.
 10 Q. Okay. And I believe you said
 11 you recognized Briggs as an authoritative
 12 textbook?
 13 A. Yes, I do.
 14 Q. Okay. What other textbooks do
 15 you recognize as authoritative?
 16 A. So what I was trained in for
 17 human development is human embryology is --
 18 usually they are -- I think that's some --
 19 Moore's is the textbook --
 20 Q. Moore's.
 21 -- we use for human embryology.
 22 Q. Okay.
 23 A. And it's the same -- it's a
 24 medical school class. It's the same book
 25 that they teach both graduate and medical

Page 174

1 students in that class and under the -- and
 2 using the same book.
 3 So for human embryology, that
 4 was the book we used for human embryology.
 5 Q. Any others?
 6 A. Yeah, there were -- there were
 7 others.
 8 Q. Okay. Well, I know you
 9 testified earlier that you looked to Briggs
 10 as an authority, and you use it in your
 11 regular teratology practice. So now we --
 12 now we have one more.
 13 Are there any others that are,
 14 you know, your regular teratology books you
 15 look towards?
 16 A. I reference Moore, I believe,
 17 in my report as well, as part of my reliance.
 18 I -- I'd have to look at my reliance list to
 19 see what other texts that I did reference in
 20 there, but those are -- those are two that I
 21 refer to regularly.
 22 Q. Okay. And just going back to
 23 something earlier, Mr. Tracey objected when I
 24 asked about your meetings with other experts.
 25 So I'm not going to ask about -- anything

Page 175

1 about those.
 2 But did you have any role in
 3 responding to our deposition notice and the
 4 answers to those?
 5 A. We went through them.
 6 Q. Okay. Do you recall answering
 7 that you had not interacted with any other
 8 experts in this litigation?
 9 A. Inasmuch as we went through
 10 the -- I -- it was only with the lawyers, and
 11 so I think they would be familiar with that,
 12 if that was --
 13 Q. Yeah. I'm not going to ask
 14 about anything that happened, but my
 15 understanding, unless I misread it, is that
 16 your answer was that you hadn't interacted
 17 with any of the other experts.
 18 But that -- we know now that's
 19 not the case, right?
 20 A. With the -- with the lawyers
 21 and on call, we did have -- I have -- I have
 22 spoken with some other --
 23 MR. TRACEY: Robert, don't say
 24 anything else.
 25 THE WITNESS: Okay.

Page 176

1 MR. TRACEY: That's all
 2 privileged.
 3 MR. MURDICA: I'm not going to
 4 ask anything else.
 5 THE WITNESS: Okay.
 6 MR. MURDICA: I was just asking
 7 in the context of the discovery
 8 responses.
 9 QUESTIONS BY MR. MURDICA:
 10 Q. Okay. And one last follow-up
 11 on something we talked about earlier.
 12 You remember I showed you I
 13 believe it was Exhibit 4, the Beyer study,
 14 and I asked you about CIC, and you said it
 15 was in the supplemental tables online.
 16 A. Oh, I told you this was the
 17 methodology that we used -- are you talking
 18 about Santos?
 19 Q. No.
 20 A. It was 4.
 21 Q. Sorry.
 22 A. Oh.
 23 Q. 3 maybe.
 24 MR. CHARCHALIS: Beyer is 3.
 25 MR. MURDICA: 3, okay.

Page 177

1 THE WITNESS: Okay. Yes.
 2 QUESTIONS BY MR. MURDICA:
 3 Q. Remember I -- this was from
 4 your rebuttal report. We were talking about
 5 I believe it was capicua and CIC in your
 6 report?
 7 A. Yes.
 8 Q. And I said where is it in the
 9 study, and you said it's in the supplemental
 10 tables?
 11 A. I said I'd need to check the
 12 supplemental tables, yes.
 13 Q. Okay. So we had checked
 14 before --
 15 A. Yes.
 16 Q. -- and we checked again.
 17 We don't see it. Is there --
 18 is there anything else -- other than CIC or
 19 capicua, is there anything else that you
 20 would look to, any names somehow we're
 21 missing?
 22 A. I -- I'd have to look at the
 23 database --
 24 Q. Okay. But you --
 25 A. -- in front of me and --

Page 178

1 Q. I'm not asking you to agree.
 2 I'm just asking you if there's any other name
 3 you would refer to that gene by or --
 4 A. Oh, the name of the gene?
 5 Q. Yeah.
 6 A. Those are both the gene names
 7 that we -- we've used. It may have had a
 8 name before that, but I would -- I'd have to
 9 look that up in the database.
 10 That should be available in
 11 GeneCards if you were looking for aliases.
 12 Q. Okay. So sitting here today,
 13 you're not telling us that it's definitely in
 14 the tables. You agree it's not in the
 15 article, but you're also not telling us that
 16 it's in the tables; you just don't know?
 17 A. I would have to look
 18 specifically at the -- at the database and
 19 mine in the database to show you exactly
 20 where everything is, but the interactions are
 21 there.
 22 I can -- I looked at them.
 23 I've seen them. I think you're just --
 24 you're not in the right place in the
 25 database.

Page 179

1 Q. Okay. But you believe you
 2 either saw CIC or capicua in the database?
 3 A. It's in the database.
 4 Q. Okay. And not in that article,
 5 Exhibit 3, itself?
 6 A. I'm looking at -- I -- as we
 7 just looked at the article, I did not see
 8 capicua in that article, but it is in the
 9 database.
 10 Q. Okay. All right. Let's talk
 11 about one more principle of teratology.
 12 You know that the Teratology
 13 Society about 15 years ago published
 14 guidelines for considering causation in
 15 litigation, right?
 16 A. I mean, if you're asking me if
 17 there's a publication about that, I'm aware
 18 that there's a publication about it.
 19 Q. Right.
 20 You've seen it before. It's
 21 been shown to you before in litigation,
 22 right?
 23 A. I have seen it before.
 24 Q. Okay. Did you look at it
 25 before rendering your opinions here?

Page 180

1 A. I'm -- yes, I am familiar with
 2 it.
 3 Q. Okay. And any causation
 4 opinion and any data you used to reach the
 5 opinion, one of the principles is it needs to
 6 be outcome-specific, correct?
 7 A. Specificity is part of Bradford
 8 Hill in that regard.
 9 Q. Yeah.
 10 And I'm asking you about your
 11 Teratology Society and the principles. When
 12 you render an opinion as a member of that
 13 society, it's supposed to be
 14 outcome-specific, right?
 15 A. Just to clarify, that position
 16 paper, which, you know, if we're going to
 17 talk about it, we should -- we should have it
 18 in front of us, but I am familiar with it, in
 19 as much as the correspondence on that's Tony
 20 Scialli, and that position is not a position
 21 of the Teratology Society as a whole. I
 22 believe that was part of the public affairs
 23 committee.
 24 Q. Okay. What it means -- well,
 25 do you -- did you disagree that you should be

Page 181

1 looking at evidence that refers to the
 2 outcome you are opining about?
 3 A. You should absolutely look
 4 at -- look at the outcome.
 5 Q. Right.
 6 And here, the outcome is ASD or
 7 ADHD. You have two outcomes you're looking
 8 at, correct?
 9 A. I did look at those two
 10 outcomes, yes.
 11 Q. Those are the two outcomes that
 12 you were asked to look at, correct?
 13 A. I was asked to look at ASD,
 14 ADHD and -- as specific outcomes, yes.
 15 Q. Okay. And so according to that
 16 principle, the evidence on which you base
 17 your causation opinion should be ASD and ADHD
 18 data, correct?
 19 A. Well, I'm not going to say that
 20 those principles are the -- are definitive or
 21 even authoritative in that regard, but if you
 22 want to talk about those -- what the
 23 publication says, then we should have it in
 24 front of us specifically.
 25 Q. Well, you don't know? It's --

Page 182

1 you're a member of the Teratology Society.
 2 A. I wouldn't take it upon myself
 3 to memorize anything Tony Scialli said.
 4 Q. Okay. So I'm just asking you
 5 then, do you think that that's what you
 6 should consider in rendering a causation
 7 opinion?
 8 A. You should consider the
 9 totality of data. We already talked about
 10 that.
 11 Q. And the totality of data
 12 specific to the outcome, correct?
 13 A. We should -- we should consider
 14 those outcomes and also intermediates of
 15 those and then parallel outcomes with those.
 16 Q. Okay. Well, you testified in a
 17 litigation attributing mental retardation in
 18 a patient to trichloroethylene exposure,
 19 correct?
 20 A. I'd have to see the particular
 21 case you're referring to.
 22 Q. Okay. You don't remember that?
 23 A. I'm -- I would have to see the
 24 particular case you're referring to.
 25 Q. How many cases have you

Page 183

1 testified in for plaintiffs?
 2 A. I would have to see the
 3 particular case --
 4 Q. Too many to remember, right?
 5 A. I have a list of them.
 6 Q. Where is it? You didn't
 7 provide it to us. Where's the list?
 8 A. I was told that the information
 9 that I was to provide was within the last few
 10 years.
 11 Q. Okay.
 12 A. And that's what I did provide.
 13 Q. Do you have -- do you have a
 14 list of all of your testimony you've ever
 15 done?
 16 A. Of course.
 17 Q. Okay. And where is that?
 18 A. On my computer.
 19 Q. Okay. Okay. So you don't
 20 remember attributing mental retardation to
 21 TCE exposure?
 22 A. I'm --
 23 MR. TRACEY: Objection. Form.
 24 THE WITNESS: No. If it's --
 25 if you're referring to a particular

Page 184

1 case that is sealed, I'm not at
 2 liberty to discuss.
 3 QUESTIONS BY MR. MURDICA:
 4 Q. It's not sealed.
 5 A. So...
 6 Q. Do you remember a plaintiff
 7 Trujillo, Trujillo?
 8 A. I'm familiar with Trujillo.
 9 Q. Okay. Do you remember now
 10 what you were alleging the outcome was?
 11 A. I mean, if you want to provide
 12 case-specific stuff, we can review it.
 13 Q. Well, what I'm asking you is,
 14 mental retardation is a different outcome
 15 than autism or ADHD, correct?
 16 A. It is.
 17 Q. Okay. So are you going to rely
 18 on the outcome of mental retardation in
 19 rendering a causation opinion on autism or
 20 ASD?
 21 A. As a different outcome, unless
 22 they have overlapping pathology, I would not
 23 include it in part of my analysis.
 24 Q. Okay. How about learning
 25 disabilities?

Page 185

1 A. So inasmuch as there are some
 2 cases with ADHD and ASD that also include
 3 learning disabilities, they would be part of
 4 an analysis.
 5 Q. But not all -- I mean, we
 6 talked earlier, right? Someone autistic can
 7 be a savant and they don't have a learning
 8 disability, correct?
 9 A. That is a possibility.
 10 Q. So you're going to use, and you
 11 did use, outcomes that were not the target
 12 outcome as reliance for your causation
 13 opinion?
 14 A. If there's overlap in the
 15 presentation as part of what's understood
 16 about -- particularly with autism itself or
 17 animal models of autism is not every case of
 18 autism is the same, and some of them have
 19 overlap with other pathologies.
 20 And so if those other
 21 pathologies included -- were included, then I
 22 would -- then I would often include them as
 23 part of the analysis.
 24 Q. Is it fair to say that if an
 25 outcome in a study was a symptom of autism in

Page 186

1 some patients or some animals, you included
 2 that in your analysis?
 3 A. I tried to include the totality
 4 of data so that I would be fair in that
 5 regard.
 6 Q. In your mind, in Dr. Cabrera's
 7 mind, is it -- is it reliable to use
 8 symptomatic outcomes rather than the target
 9 outcome of ASD or ADHD?
 10 A. It could be informative if
 11 it -- if it is occurring with other outcomes
 12 that are core behaviors of ADHD or ASD.
 13 If it -- if it's occurring as
 14 an endpoint specifically and without overlap
 15 of ADHD or ASD, then I would not consider
 16 that.
 17 Q. Right.
 18 But in Dr. Cabrera's opinion,
 19 any study where the outcome was learning
 20 disability counts towards autism, correct?
 21 A. Is not correct.
 22 Q. Why not?
 23 A. Because there are some impacts,
 24 and it's even referenced in the -- in the AOP
 25 where they indicate that some indications of

Page 187

1 learning disability can be core symptoms of
 2 autism or of ADHD.
 3 Q. Right.
 4 And that's why you think that
 5 AOP speaks to autism, correct?
 6 A. Well, that's -- not just the
 7 AOP, but those are part of the OECD
 8 guidelines for testing, that some learning
 9 and behavioral effects overlap with autism
 10 and ADHD core behaviors.
 11 Q. Okay. And according to
 12 Dr. Cabrera, that AOP also speaks directly to
 13 autism and that -- the pathway, correct?
 14 A. Yes, because the -- some of the
 15 learning and developmental endpoints do
 16 overlap with autism, and that's even in the
 17 OECD guidelines. Not just the AOP, the OECD
 18 guidelines.
 19 Q. Okay. And according to
 20 Dr. Cabrera, any neurodevelopmental toxicity
 21 also is an outcome that you're looking at to
 22 attribute causation for ASD and ADHD,
 23 correct?
 24 A. I did include in my analysis
 25 any neurotoxicity.

Page 188

1 Q. Right.
 2 But not -- all neurotoxicity
 3 does not equate to ASD or ADHD, correct?
 4 A. That's correct. The --
 5 particularly for ASD or ADHD, it would be
 6 developmental neurotoxicity that would be
 7 more specific for those outcomes, but I did
 8 consider neurotoxicity generally as well.
 9 Q. And even if you, Dr. Cabrera,
 10 considered only developmental neurotoxicity,
 11 that's still a larger pool than ASD and ADHD,
 12 correct?
 13 A. There are other endpoints with
 14 developmental neurotoxicity such as neural
 15 tube defects would be evidence of
 16 developmental neurotoxicity that's not ADHD
 17 or ASD.
 18 Q. Right.
 19 I think we agreed earlier,
 20 neural tube defects are something totally and
 21 profoundly different than ASD or ADHD,
 22 correct?
 23 A. Well, I don't know about
 24 totally different because inasmuch as there
 25 appears to be some overlap in the molecular

Page 189

1 pathways, but certainly the -- one is a
 2 phenotypic presentation, and one is a
 3 diagnostic determination based on clinical
 4 diagnostics.
 5 Q. The appearance and the outcome
 6 are profoundly different, correct?
 7 A. I agree with that.
 8 Q. Okay. Before the break, we
 9 were talking about different levels of
 10 evidence that are available, and we were
 11 talking about evidence that could be
 12 available in humans.
 13 I'm going to ask you -- you
 14 focused a lot in your report on animals,
 15 right?
 16 A. That's correct.
 17 Q. And you work with animals?
 18 A. I work with people, too, but,
 19 yes.
 20 Q. And the animals you work with
 21 are -- do you work with rats or just mice?
 22 A. Mice.
 23 Q. The outcomes that you looked at
 24 in mice is any developmental toxicity,
 25 correct?

<p style="text-align: right;">Page 190</p> <p>1 A. I look for developmental 2 toxicity generally, yes. 3 Q. You included in your review 4 articles that really had anything to do with 5 toxicity in a -- in a mouse embryo, right? 6 A. So my approach as a 7 teratologist was to look at what Wilson 8 referred to as the four manifestations of 9 deviant development, and those include 10 congenital malformations in addition to 11 functional deficit. 12 And it may also include death 13 as a potential outcome, which would be the 14 most severe form of that -- of toxicity. 15 Q. For ASD and ADHD in particular, 16 what outcomes were you looking for in the 17 mouse model? 18 A. Well, part of looking for these 19 outcomes is understanding the study designs 20 and what information is available in there. 21 As an example, you have to 22 examine also maternal toxicity. So you have 23 to consider maternal toxicity, even though 24 your -- your question may be, What's the 25 outcome in the offspring, ADHD or ASD, you</p>	<p style="text-align: right;">Page 192</p> <p>1 that are consistent -- what's referred to as 2 consistent with ADHD in the animal model. 3 Q. You look -- right. 4 You have -- you have guidelines 5 that you believe are behaviors consistent 6 with those, but you can't diagnose a mouse 7 with ADHD or autism, correct? 8 A. Right. So clinical diagnosis 9 of ADHD or autism requires a clinical 10 diagnosis, and we don't do that type of 11 assessment on the animals. We do 12 neurobehavioral, behavioral testing on them. 13 Q. Right. 14 And those are different 15 techniques developed over time that 16 researchers like yourself believe are 17 consistent with neurodevelopmental behaviors, 18 right? 19 A. I'd say they're generally 20 accepted that these behaviors parallel what 21 we see in the human with similar exposures. 22 Q. Well, in fairness, humans 23 aren't burying marbles in tanks, correct? 24 A. They could, but it -- as a 25 normal behavior, burying is perhaps something</p>
<p style="text-align: right;">Page 191</p> <p>1 also have to consider maternal toxicity as 2 one of those factors. 3 So there are -- there are 4 different levels of toxicity because the 5 maternal system is providing the environment, 6 so you have to consider other types of 7 toxicity when you're looking at a particular 8 outcome. 9 Q. What specifically are you 10 looking for in the mouse to look for autism? 11 A. So typically we do 12 neurobehavioral testing in the mouse to look 13 for what's referred to as core autistic 14 behaviors. 15 Q. And in the mouse, since they 16 can't talk to us, you can't actually 17 diagnosis a mouse with autism, correct? 18 A. They do vocalize, but it's 19 supersonic, so we can't hear them, but we do 20 not use that as part of our diagnosis like 21 you would with a human patient. 22 Q. And it's the same thing with 23 ADHD, right? 24 A. So we do neurobehavioral 25 testing on them, and we look for behaviors</p>	<p style="text-align: right;">Page 193</p> <p>1 that people and animals may have shared in 2 the past, but not something that we commonly 3 engage in anymore. 4 Q. You're not looking at human 5 beings who are repetitively -- repetitively 6 grooming or nest-seeking or burying marbles, 7 correct? 8 A. So we do look at repetitive 9 behaviors in humans. That's part of a 10 clinical diagnosis. So that is part of it, 11 actually. 12 But in regards to specific 13 behaviors of nest-seeking or marble burying, 14 that's not part of the human clinical 15 diagnosis. 16 Q. Right. 17 And, by the way, is 18 nest-seeking in the rodent model a measure 19 for ASD or ADHD? 20 A. In their recognition of 21 things -- so, like, socialization is part of 22 the ASD or core behaviors. And so disruption 23 in what is partially thought as the olfactory 24 system is -- can be related to that, in that 25 the mouse, unlike the human, which is largely</p>

Page 194

1 visual, the mouse uses smells in order to
 2 recognize where it belongs and new people --
 3 or new mice, in this case. As we might
 4 recognize somebody visually, they recognize
 5 it as smell.
 6 So it's part of an assessment
 7 for their social behavior, which would be an
 8 important core behavior for the -- for the
 9 mouse.
 10 Q. That answer was about
 11 nest-seeking?
 12 A. Yes, in order for them to --
 13 Q. So according to Dr. Cabrera,
 14 nest-seeking is a relevant behavior in the
 15 mouse model for autism and ADHD, right?
 16 A. Well, it assesses a behavior in
 17 the mouse that's part of social -- a social
 18 behavior. So you're testing a social
 19 behavior of the mouse.
 20 Q. So if you have a litter of mice
 21 that are more nest -- are nest-seeking more
 22 than normal, you would say that's an autistic
 23 or ADHD signalling behavior or something like
 24 that?
 25 A. So you could go either way. So

Page 195

1 if they spent too much time there, this could
 2 be associated with anxiety. If they didn't
 3 spend any time there, then this could be a
 4 problem with their social behavior. So you
 5 have to interpret the data as it comes.
 6 Q. And when you first started
 7 doing these experiments on mice, did these
 8 behavioral beliefs and tests in mice exist?
 9 A. They've evolved over time.
 10 Q. And do you agree that those
 11 behavioral observations are really theories
 12 because you can't diagnose and talk to the
 13 mice?
 14 A. Well, just to clarify, a theory
 15 is a very strong word in science, and I would
 16 say that there -- our understanding of those
 17 behaviors, that they are part of the social
 18 behaviors in the animals. And I don't think
 19 that's theoretical. I think that's part of
 20 just the reality that they -- that they exist
 21 in.
 22 Our interpretation of those is
 23 certainly open as far as what that means and
 24 how we interpret their behaviors.
 25 Q. I guess that -- let me ask a

Page 196

1 better question, because that was a good
 2 point.
 3 Our hypothesis, your
 4 hypothesis, is that those behaviors translate
 5 in some way to neurodevelopmental outcomes --
 6 neurodevelopmental behaviors in human beings,
 7 right?
 8 A. So what we do in -- what I've
 9 done for the majority of my career is to make
 10 animal models of human disease. And part of
 11 making those models of human disease is to
 12 see if the animal behaviors any way parallel
 13 what we would find in human behaviors, and we
 14 do find some parallels in that regard.
 15 Q. Right.
 16 But the behaviors that the
 17 animals exhibit are not identical behaviors
 18 that are -- that human beings exhibit,
 19 correct?
 20 A. Neither -- the diagnosis
 21 criteria is not the same as would be used
 22 clinically for a clinical diagnosis in
 23 humans. It does -- it is different with the
 24 animals.
 25 Q. And you agree that the animal

Page 197

1 model, in all aspects, not just
 2 neurodevelopment, does not translate directly
 3 to humans in many cases, right?
 4 A. There are -- there can be
 5 differences, both by differences in species.
 6 Thalidomide is the classic example inasmuch
 7 as it had a profound effect in humans, but it
 8 was initially missed in animals. It was only
 9 after they retested in a sensitive rabbit
 10 species that they found -- they found the
 11 same effect.
 12 So there can even be
 13 species-specific differences that have to be
 14 considered, and they can be different between
 15 different species.
 16 Q. One does not assume that what
 17 happens in an animal is going to happen in a
 18 human or vice versa, correct?
 19 A. Yeah, you can't just assume
 20 based on a singular dataset. You need to
 21 look at the totality of the data, and you
 22 build strength when you start to see effects
 23 across multiple species, or particularly even
 24 across multiple kingdoms in biology when you
 25 start to see similar effects. This builds

<p style="text-align: right;">Page 198</p> <p>1 strength that a similar outcome will also 2 occur in humans.</p> <p>3 Q. Okay. So if you're looking at 4 an outcome in an animal model for ASD or 5 ADHD, what is the most -- most direct, best 6 evidence you can come up with in an animal 7 model?</p> <p>8 A. Well, there's two parts to that 9 in my work. And so one is that to look at 10 the behavior, so we have the behavior 11 analysis, then we compare to what's 12 considered as kind of a core set.</p> <p>13 And in my work, it's typically 14 compared to valproic acid. So we would 15 compare the core behaviors to valproic acid 16 exposures in the animal.</p> <p>17 And then we would also do 18 pathology on the brains of the animals in 19 addition to, if available, functional 20 genomics, that is gene expression studies, or 21 metabolomics to look at the particular active 22 molecules in the brain.</p> <p>23 Q. And the behaviors you would be 24 looking for in an autism model are what?</p> <p>25 A. So the same core behaviors that</p>	<p style="text-align: right;">Page 200</p> <p>1 behavior on an outcome, like ASD and ADHD, 2 after an exposure in a pregnant mouse, 3 studies that are examining effects on adult 4 mice are not directly on point, correct?</p> <p>5 A. They may be informative on 6 concentrations or mechanism, but they're not 7 going to be necessarily informative on the 8 outcome, the specific ASD or ADHD outcome.</p> <p>9 Q. Okay. Let's talk now about 10 human studies and acetaminophen.</p> <p>11 In order for an in utero 12 exposure to happen in a human, the exposure 13 has to first be -- the mother has to take 14 acetaminophen, right? You agree?</p> <p>15 There's, like, four steps here. 16 I'll see if you agree with them.</p> <p>17 A. So there is some background of 18 acetaminophen exposure in the general 19 population, and it has to do with 20 environmental exposure. And so there's an 21 underlying exposure initially.</p> <p>22 Q. Dr. Cabrera, your causation 23 opinion here is focused on women who actually 24 ingest pharmaceutical acetaminophen, correct?</p> <p>25 A. That is correct.</p>
<p style="text-align: right;">Page 199</p> <p>1 we might see in humans. So differences in 2 social interactions, repetitive behaviors. 3 And so we're looking for this core set of -- 4 referred to as autism behaviors in the mouse, 5 and there are representative tests for that.</p> <p>6 Q. They're very specific in the 7 mouse, though, right?</p> <p>8 One is -- the repetitive 9 behavior is grooming, the social behavior is 10 either being around other mice or not. 11 Right?</p> <p>12 A. So one example of a social 13 behavior would be referred to as a 14 three-chamber test, or what we call the 15 Jackie box, where the animal -- we see if it 16 prefers or doesn't prefer to be around other 17 animals, which would be a social behavior. 18 And there are different types of social 19 behavior.</p> <p>20 And what's currently 21 recommended is to use multiple tests per 22 behavior -- or per core behavior to 23 strengthen the information you have about 24 those behaviors.</p> <p>25 Q. And if you're trying to gather</p>	<p style="text-align: right;">Page 201</p> <p>1 Q. Okay. So the pregnant woman 2 first takes acetaminophen, right? In the 3 mouth?</p> <p>4 A. Predominantly. There is also 5 IV indications, but, yes, predominantly.</p> <p>6 Q. Your opinion is about pill 7 ingestion predominantly, correct?</p> <p>8 A. I haven't been asked for 9 case-specific as far as exposures, but 10 we're -- the exposure happens, and there are 11 currently two routes of exposure commonly. I 12 think there's also a rectal exposure as well, 13 but the majority of them, the vast majority 14 of them, would be an oral exposure.</p> <p>15 Q. The human exposure studies 16 where it specified what it was, it was pill 17 ingestion, correct?</p> <p>18 A. Predominantly, yeah, it's going 19 to be pill ingestion.</p> <p>20 Q. Okay. The first stop is -- 21 where the body takes on any acetaminophen is 22 in the small intestine, correct?</p> <p>23 A. As far as absorption, yes.</p> <p>24 Q. Absorption.</p> <p>25 A. Yes.</p>

Page 202

1 Q. Then it goes to liver, correct,
2 in the mother?

3 A. Well, in -- yeah, as far as
4 metabolism goes, it goes into a particle,
5 it's referred to as a chylomicron, and then
6 that would end up in the liver.

7 Q. Okay. Whatever is not
8 metabolized by the liver is now in the blood
9 in the mother, right?

10 A. Fair enough. It -- yeah. So
11 it's going to go into circulation as well.

12 Q. Into circulation.

13 And in circulation, that is the
14 first time it has access to the placenta,
15 right?

16 A. So within circulation, yes, it
17 would have access to the placenta.

18 Q. Okay. It has to cross the
19 placenta, right?

20 A. In order to have access, which
21 we refer to as access in teratology, it would
22 have to cross the placenta.

23 Q. In order to have access to the
24 baby, we're through the mouth, small
25 intestine, metabolized by the liver, into the

Page 203

1 bloodstream, it has to cross into the
2 placenta, correct?

3 A. No. I'd say as far as first or
4 second-pass metabolism, I have to look
5 specifically at that, but that's at least in
6 part correct, yes.

7 Q. Okay. And then next to
8 actually access the baby, it -- the brain,
9 right, which is what you're talking about in
10 this opinion, it has to cross the blood-brain
11 barrier, right?

12 A. Acetaminophen readily crosses
13 the blood-brain barrier. So if it has access
14 to the baby, it will have access to the
15 brain.

16 Q. Right.

17 All of those things have to
18 happen before it makes it to the fetal brain,
19 correct?

20 A. That is correct.

21 Q. Okay. And you haven't --
22 you've cited various studies, but you haven't
23 cited anything that directly measures the
24 availability of acetaminophen following that
25 exposure route in the fetal brain, correct?

Page 204

1 A. I have looked at fetal brain
2 exposure in the animal models, and I have
3 cited that in my report.

4 Q. I was talking about human.

5 A. As we've already indicated,
6 those studies would be unethical.

7 Q. And all I'm doing, for the
8 record, is clarifying what we have and what
9 we don't.

10 We don't have any study or data
11 that shows the availability in the fetal
12 brain at this -- at this point in time
13 because of ethics and things like that, fair?

14 A. Yeah. Just to be clear, I'm
15 fairly sure that's, like, even against the
16 law in Texas. But with that being said, that
17 data doesn't exist.

18 Q. Right.

19 A. For any drug.

20 Q. But we have it in the mouse
21 model.

22 A. We do have it in animal models.

23 Q. Right.

24 All right. I'm going to stick
25 with humans for a while.

Page 205

1 One of the database studies you
2 cite is Avella-Garcia. And that's an autism
3 study, right?

4 A. Yes, it is.

5 Q. Okay. And you rely on this to
6 support your causation opinion, right?

7 A. I have, yes.

8 MR. MURDICA: We'll mark it as
9 Exhibit 9.

10 (Cabrera Exhibit 9 marked for
11 identification.)

12 QUESTIONS BY MR. MURDICA:

13 Q. Okay. This one was from --
14 well, you have in front of you Exhibit 9,
15 right, Dr. Cabrera?

16 A. Yes, I do.

17 Q. Okay. And that's the
18 Avella-Garcia study, right?

19 A. It is.

20 Q. This is the one you cited in
21 your opinions, fair?

22 A. I believe so, yes.

23 Q. From 2016?

24 A. Looks correct.

25 Q. Okay. So this was at the point

Page 206

1 that you already formulated an opinion that
 2 acetaminophen could cause autism and ADHD,
 3 right?
 4 A. As I indicated, there was
 5 growing evidence of that since 2015.
 6 Q. I think you said earlier
 7 that -- well, correct me if I am wrong. I
 8 thought you -- your causation of -- you
 9 believed that it was causal as of 2016, I
 10 thought you said.
 11 Is that not right?
 12 A. I hadn't done this research in
 13 2016.
 14 Q. Okay. So sitting here today,
 15 you can't say when, in Dr. Cabrera's mind,
 16 this became causal until -- except for 2023,
 17 right?
 18 A. That's when I did the causation
 19 analysis. So I couldn't say I had determined
 20 causality before then because I hadn't done
 21 that analysis.
 22 Q. And you couldn't say anybody
 23 could have determined causation before then
 24 because you didn't do that analysis, right?
 25 A. Well, I can't offer my opinion

Page 207

1 about what other people did because I'm not
 2 other people.
 3 Q. But you, Dr. Cabrera, when I
 4 asked you, you -- based on the totality of
 5 the evidence that you've reviewed, you can't
 6 say there was enough there in 2022, right?
 7 A. 2022?
 8 Q. Yeah.
 9 A. I wasn't looking at the
 10 question in 2022.
 11 Q. Right.
 12 But based on what you know
 13 today, you -- you're not going to sit here
 14 and say there was enough evidence in 2022 for
 15 this to be causal, right?
 16 MR. TRACEY: Jim, let me just
 17 interrupt you for a second.
 18 Are we doing liability
 19 depositions? Because if we are, I'm
 20 happy to join with your experts, but I
 21 thought this was a general causation
 22 deposition.
 23 MR. MURDICA: It is. And
 24 that's not what --
 25 MR. TRACEY: So we're going to

Page 208

1 do what we knew and when we knew it?
 2 MR. MURDICA: I'm not doing
 3 that. I'm -- Sean, I'm asking him
 4 questions about general causation.
 5 MR. TRACEY: No, you're not.
 6 You're asking him questions about when
 7 anybody could have known that Tylenol
 8 caused autism.
 9 I'm happy to play that game
 10 with your experts, if you want, but I
 11 thought this was a general causation
 12 deposition.
 13 MR. MURDICA: Okay. I'm not
 14 going to argue on the record with you,
 15 but all I asked him to say is he's not
 16 going to say when somebody could have
 17 known it, and he didn't answer that
 18 question.
 19 MR. TRACEY: Well, I know,
 20 because he hasn't been asked that
 21 question, and he hasn't developed that
 22 opinion. That's a phase II opinion.
 23 He may very well have that opinion
 24 when we finish depositions.
 25 MR. MURDICA: Okay. Well, let

Page 209

1 me try and --
 2 MR. TRACEY: I just -- it just
 3 feels like it's part of the phase I.
 4 QUESTIONS BY MR. MURDICA:
 5 Q. Sitting here today,
 6 Dr. Cabrera, do you have any opinion on when
 7 the relationship, in your view, was causal,
 8 one way or another?
 9 A. I only have my personal
 10 experience in that when I conducted the
 11 analysis, I found it to be causal. I can't
 12 say when other people should or shouldn't
 13 have found it.
 14 Q. In 2023, correct?
 15 A. That's correct.
 16 Q. Okay. Now, on Exhibit 9, so
 17 this was a database study in human beings,
 18 right?
 19 A. I'm not sure what you mean by
 20 "a database study."
 21 Q. Okay. There were maternal
 22 interviews at 12 and 32 weeks during
 23 pregnancy, correct?
 24 A. That is correct.
 25 Q. Okay. And there were about

Page 210

1 1,300 participants?

2 A. So there was 2,644 mother-child

3 pairs. So as a -- as a child outcome, there

4 would be 1,300.

5 Q. Okay. And if you look at

6 Table 3, which is on page 1992 in the

7 journal, these are the outcomes. And what

8 you cite in your report is for males --

9 Are you on Table 3?

10 A. Yes, I am.

11 Q. Okay.

12 -- for males with persistent --

13 that were exposed to persistent acetaminophen

14 exposure which was defined in this study as

15 the mother saying that acetaminophen was used

16 during both interviews, I believe. The score

17 in the right column is a 1.91 from .44 to

18 3.38, right?

19 A. Could you repeat the question?

20 Q. Sure.

21 If you look under males --

22 well, let's start with all participants.

23 Do you see that part, where it

24 says "All participants, never sporadic,

25 persistent," Dr. Cabrera?

Page 211

1 A. Yes, I do.

2 Q. So if you look at any of those

3 for all participants, the total score is

4 never positive and statistically significant,

5 correct?

6 A. So that's part of the data.

7 There is significant effects in regards to

8 omission of errors. The total score is not

9 significant.

10 Q. Okay. And if you look -- then

11 they break it down by sex, right, between

12 male and female children?

13 A. They do.

14 Q. Okay. And if you look at males

15 with persistent use, it is -- the effect

16 is -- the score is 1.91, and it's

17 significant, correct?

18 A. To be clear, it's 1.91, and the

19 odds ratio crosses -- crosses 1. So that

20 would not be reported as significant,

21 although in the omission errors, the risk is

22 1.56 and that is statistically significant.

23 It does not cross 1 with the confidence

24 interval of 1.09 to 2.24.

25 Q. Okay. And that's for 21 of the

Page 212

1 1,300 children that are behind that score,

2 correct?

3 A. You may want to ask that

4 question again.

5 Q. Sure.

6 You're looking under males --

7 A. Yes.

8 Q. -- with persistent use?

9 A. (Witness nods head.)

10 Q. And is 21. That's 21 boys,

11 correct?

12 A. That's correct.

13 Q. And then you're looking at the

14 omissions and errors column, and you just

15 cited to use the 1.56 from 1.09 to 2.24,

16 correct?

17 A. Sorry. That's correct.

18 Q. Okay. And the -- that data is

19 based on 21 children of the 1,300

20 participants, correct?

21 A. That is what it says, yes.

22 Q. Okay. That's about, what, 1,

23 1 and a half percent of the study population?

24 A. Approximately.

25 Q. When Dr. Cabrera decided how to

Page 213

1 weigh, quote/unquote, evidence like this, did

2 Dr. Cabrera consider miniscule population

3 sizes within a larger study to give credit or

4 discredit to a result like this?

5 A. I did not discredit the study

6 based on a small number of participants. I

7 considered the totality of data.

8 Q. Okay. And the totality, with

9 the total score, for all participants, as we

10 saw above, was not significant, right?

11 A. In regard to the CAST total

12 score, it was still an increased risk at

13 1.91, but it was not significant based on the

14 confidence interval.

15 Q. Okay. And that's for males,

16 but with all participants, when you consider

17 males and females, it would -- it would be

18 even more attenuated, right?

19 A. It was.

20 Q. Okay. And then if we look at

21 females, and we look at -- let's take, for

22 example, sporadic use of acetaminophen during

23 pregnancy.

24 Are you with me --

25 A. Yes, I am.

Page 214

1 Q. -- that row?

2 And we look at the total score,

3 for 287 female children, the score is -- you

4 didn't like when I used the word

5 "protective," so you could use your own. But

6 it's protective and statistically

7 significant, correct?

8 A. It was deemed to be

9 statistically significant and with a reduced

10 risk.

11 Q. Right.

12 So if we were blindly

13 practicing medicine and relying only on this

14 study and we knew that our patient was going

15 to have a girl, this would indicate we should

16 give sporadic dosing of acetaminophen

17 throughout pregnancy to protect from autism,

18 correct?

19 A. I would not practice medicine

20 like that. And I hope no one else does

21 either.

22 Q. Doctor, based on this study and

23 this study alone, in this population, the

24 mothers who were having girls who took

25 acetaminophen actually protected their

Page 215

1 daughters from autism, according to this

2 dataset, correct?

3 A. There was a decreased risk with

4 sporadic use.

5 Q. And you just said if you could

6 prescribe medicine, you would not prescribe

7 acetaminophen based on this one number, and

8 that you would agree that applies to any

9 number in any study, right?

10 A. I wouldn't propose that

11 sporadic use should be used protectively

12 outside of its use to treat fevers, and in

13 which case it very well could provide a

14 protective effect.

15 Q. And you don't -- you don't make

16 a decision based on one of many findings

17 statistically in a study, correct?

18 A. To be clear, the expectation is

19 that none of the findings will be significant

20 or, if any, that they would only be whatever

21 the alpha is. So you would expect a false

22 discovery of, say, 5 percent of that data.

23 And so we consider all of the

24 data under that -- under those understanding.

25 Q. Right.

Page 216

1 And, in fact, when we look at

2 most of the human data that we have on

3 acetaminophen and pregnancy, it was not

4 collected for that purpose at all, right?

5 A. I'm --

6 Q. Did you say right?

7 A. I don't understand the

8 question.

9 Q. Okay. Sure. Let me lay a

10 little more foundation for you.

11 You cited and looked at several

12 ADHD, in particular, but some autism,

13 database studies that looked at pregnancy

14 databases particularly in Norway and the

15 Scandinavian countries, correct?

16 A. So maybe that's just a

17 difference in definition, but I think of

18 these as -- they're cohort studies.

19 Q. Okay. Cohort studies.

20 A. Right. Database makes it sound

21 like their virtual.

22 Q. Okay. Well, there's a dataset

23 that's based on -- in those countries, it's

24 based on health registries because of

25 national -- you know, public insurance,

Page 217

1 right?

2 A. I'm familiar, yeah.

3 Q. Okay.

4 A. I've done some work with those

5 studies.

6 Q. Okay. So that data was

7 collected by the -- by the government of

8 those countries not to study acetaminophen,

9 right?

10 A. Similar to what we do here with

11 National Birth Defects Prevention Study,

12 which we're also a part of, it's a

13 surveillance. It's to surveil a population

14 for adverse outcomes.

15 Q. And they run and other

16 researchers run tons and tons of analysis

17 across that data because it collects it for

18 everybody because it's a national insurance

19 program, right?

20 A. I don't know that it collects

21 it for everyone, but it does collect it for

22 everyone that's part of the national health

23 care system.

24 And it then goes into the

25 system that can be queried in that regard

Page 218

1 and -- but the samples themselves are both
 2 archived and analyzed because I've been part
 3 of the analysis for those samples as well.
 4 Q. Right.
 5 My point is, right now someone
 6 could be running comparisons and studies
 7 across that data for tons of outcomes, and we
 8 will never hear about them because they turn
 9 out to not be anything, right?
 10 A. Well, you're saying if they're
 11 negative results -- encouraged to also
 12 publish the negative results, but I couldn't
 13 say whether they would or wouldn't publish
 14 them.
 15 Q. Right.
 16 But by and large what gets
 17 published are -- even if there's negative
 18 results with them, it's the positive results
 19 that people find interesting and that make it
 20 into the journals most likely, right, most
 21 often I should say?
 22 A. Most often. I think it's
 23 common to like headlines, unfortunately.
 24 Q. Right.
 25 And there's a name for that,

Page 219

1 right?
 2 A. What is the name for that?
 3 Does it say it here?
 4 Q. Publication bias, right,
 5 Doctor? There's a name you -- people who do
 6 this use, and it's called publication bias
 7 for what we just discussed?
 8 A. Ah, in regards to being more
 9 likely to publish positive findings, that
 10 there's potential publication bias there. In
 11 addition, there's potential publication bias
 12 for repackaging results to pile the
 13 literature with a particular outcome.
 14 Q. And we see that sometimes with
 15 meta-analyses of one or two studies that
 16 really just repeat the same thing, but now
 17 they're a meta-analysis, right?
 18 A. Well, a specific example we see
 19 quite often with clinical studies to try to
 20 promote the use of particular medications,
 21 this packing of the literature, but there is
 22 the potential for it in meta-analysis if you
 23 don't consider the same group publishing
 24 multiple times.
 25 Q. So the answer to my question

Page 220

1 was "yes," and then you gave me another
 2 example of clinical studies, right?
 3 A. I -- that was my answer, so...
 4 Q. Okay. Fine, then I'll ask it
 5 again.
 6 Another example of publication
 7 bias is that if you have a study finding a
 8 positive association and then a second one
 9 comes out, that first author sometimes might
 10 do a meta-analysis of the two and republish
 11 the same thing.
 12 And they'll get published
 13 again, and now it looks like there's three
 14 studies and a meta-analysis when really it's
 15 just still just two studies, correct?
 16 A. Is this a hypothetical?
 17 Q. Yeah.
 18 A. If that happened
 19 hypothetically, then it could create some
 20 bias in the literature.
 21 Q. Okay. Let's go back to
 22 literature.
 23 How important was Exhibit 9 to
 24 your causation opinion?
 25 A. I'd say it was a study I

Page 221

1 considered as part of -- part of the
 2 analysis, so...
 3 Q. Which number in Table 3 is most
 4 significant to you for your causation
 5 opinion?
 6 A. So my general question is, are
 7 there findings of increased risk in these
 8 tables? And I see that there are increased
 9 risks, particularly with persistent use in
 10 omission errors.
 11 So that would be a finding
 12 that's consistent in the different groups in
 13 omission errors.
 14 Q. And how do you balance that
 15 with the lack of findings in several of these
 16 results and the opposite findings, the
 17 protective findings?
 18 A. So in regards to the CAST score
 19 in particular, it's simply a matter of is --
 20 are we consistently finding negative or
 21 decreased risk in multiple studies, if you
 22 wanted to say that there was a protective
 23 effect. We could look for the same thing,
 24 and so to consider that also, so...
 25 Q. Right.

Page 222

1 So if you only had this paper,
 2 Exhibit 9, would you say that acetaminophen
 3 causes autism in human children?
 4 A. I would say it was still
 5 unclear.
 6 (Cabrera Exhibit 10 marked for
 7 identification.)
 8 QUESTIONS BY MR. MURDICA:
 9 Q. Let's take a look at another
 10 one.
 11 Okay. Dr. Cabrera, I've marked
 12 and put in front of you Exhibit 10, and I'm
 13 going to represent to you that it's a
 14 Ji study from 2020.
 15 Do you have it?
 16 A. I do, yes.
 17 Q. Are you familiar with it?
 18 A. Yes, I am.
 19 Q. Do you rely on it in your
 20 report?
 21 A. Yes, I do.
 22 Q. Okay. Now, in Dr. Cabrera's
 23 world, how important are cord blood studies?
 24 A. It can be very important.
 25 Q. Okay. And where do they fall

Page 223

1 in your hierarchy of evidence?
 2 A. If supportive, they provide
 3 strong evidence.
 4 Q. Okay. And do all cord blood
 5 studies only capture the peripartum period of
 6 time?
 7 A. Well, it could be pre or peri
 8 in regards to cord blood, depending on when
 9 the medication was administered.
 10 Q. The cord blood studies that
 11 you're aware of are taken around the time of
 12 birth, though. This is not like a genetic
 13 testing in the first 15 weeks tests we're
 14 talking about, correct?
 15 A. So the collection of the cord
 16 blood itself is perinatally, during delivery.
 17 Q. That's what I was asking you
 18 originally.
 19 Okay. So what would be in the
 20 cord blood would reflect -- depending on the
 21 half-life of whatever we're looking for, it
 22 would reflect what was in the cord -- or what
 23 the cord was exposed to around the time of
 24 delivery, correct?
 25 A. Preceding delivery.

Page 224

1 Q. Preceding delivery, okay.
 2 But immediately or close to
 3 that preceding delivery depending on the
 4 half-life of whatever is being studied,
 5 right?
 6 A. As a function of the half-life.
 7 Q. Okay. And you looked at the
 8 study already, right?
 9 A. Yes, I have.
 10 Q. Okay. And was the cord blood
 11 in this study collected specifically to study
 12 acetaminophen?
 13 A. Well, initially -- I don't know
 14 that they were initially. I'm looking for
 15 that, so...
 16 Q. Okay. Do you know how often
 17 the mother's exposure to acetaminophen during
 18 the pregnancies that resulted in the cord
 19 were collected?
 20 A. Could you repeat that question,
 21 please?
 22 Q. Sure.
 23 Ultimately for however many --
 24 so not everyone who was enrolled in this
 25 dataset ended up having harvested cord blood,

Page 225

1 correct?
 2 A. That is correct.
 3 Q. Okay. Only about a third
 4 actually had their cord blood harvested that
 5 had been enrolled, correct, a little less
 6 than a third?
 7 A. To be clear, the math again is
 8 mother-infant dyads at 3,163, so...
 9 Q. You're right. It's more like
 10 two-thirds, not one-third, fair?
 11 A. I -- yes, that's -- closer to
 12 two-thirds, yes.
 13 Q. Okay. And what measurements
 14 were taken throughout the pregnancy as to
 15 exposures to different medications?
 16 A. So the information that they
 17 include in the study includes maternal age of
 18 delivery, maternal race and ethnicity,
 19 maternal education level, maternal status,
 20 stress during pregnancy, smoking before or
 21 during pregnancy, alcohol use before and
 22 during pregnancy, maternal BMI, parity, child
 23 sex, delivery type, preterm birth and low
 24 birth weight.
 25 And then there's additional

Page 226

1 stratification, but I don't see specific
2 indication about other medication.

3 Q. Right.

4 Dr. Cabrera, they never asked
5 the mothers who -- whose cord blood was
6 sampled here whether they -- whether they
7 took acetaminophen ever once or how often,
8 correct?

9 A. I -- my understanding is, as
10 indicated in my report, they did not ask.
11 They measured for acetaminophen in the cord
12 blood but didn't correlate that with a
13 recall.

14 Q. Right.

15 And another way -- so they
16 didn't ask the mothers if they were exposed
17 to acetaminophen. They also didn't ask them
18 when they were exposed to acetaminophen,
19 correct?

20 A. That is my understanding.

21 Q. Okay. So the only thing we
22 have from Exhibit 10 is this one snapshot of
23 time right before delivery, correct?

24 A. Well, we have acetaminophen
25 exposure or documented acetaminophen

Page 227

1 exposure.

2 Q. Only at this one period, small
3 window of time at the very last hour of
4 pregnancy, correct?

5 A. I disagree with that. It's not
6 the very last hour --

7 Q. Okay.

8 A. -- but preceding pregnancy
9 based on the half-life, which is a few hours.

10 Q. Okay.

11 A. And so the expectation is
12 within -- it would be reasonable to say half
13 a day of an exposure beforehand.

14 Q. Okay. And I asked you before
15 if this was intentionally -- if this study
16 was intentionally done to study
17 acetaminophen.

18 Do you now -- do you now agree
19 that it was just done to study any
20 metabolites in cord blood?

21 A. Based on the study criteria
22 initially, it was to look at metabolites
23 in cord blood.

24 Q. Right.

25 So this is -- this is one paper

Page 228

1 that came out of this study, but you know
2 that many other things were studied other
3 than acetaminophen, right?

4 A. They did study other things --

5 Q. Okay.

6 A. -- in this cohort.

7 Q. And you just said, you know,
8 it's probably a snapshot of the -- of the
9 half a day before delivery.

10 They didn't ask the mothers
11 whether they took acetaminophen for the
12 initial pains of labor, right?

13 A. As far as I know, there -- they
14 didn't ask the mom about medication usage in
15 regards to acetaminophen.

16 Q. And you know that -- well, you
17 haven't experienced personally, I assume, but
18 you know that labor is painful, right?

19 A. I -- I've been told.

20 Q. You know that one indication
21 for acetaminophen is pain, right?

22 A. I'm aware of that.

23 Q. Okay. Wouldn't you expect,
24 based on those two facts, that some women
25 would have acetaminophen in their cord blood

Page 229

1 because they took acetaminophen shortly
2 before they went to the hospital or on their
3 way to the hospital until they got proper
4 pain management?

5 A. To be clear, if it was a --
6 that would be something similar to a random
7 effect error. You wouldn't expect to find a
8 dose-response with an outcome.

9 Q. Well, I just --

10 A. Something like a random effect
11 error. A random exposure.

12 Q. Sure.

13 Oh, and we're going to get to
14 that. I'm just asking you as a
15 logical-thinking, breathing human being who
16 knows a little something about the real
17 world, would it surprise you if mothers were
18 taking acetaminophen for the pains of labor
19 before were properly treated as a -- at a
20 hospital?

21 A. If they didn't know the
22 potential risks, then I could understand them
23 taking it to help with the pain.

24 Q. And if somebody takes
25 acetaminophen because of the pain of labor on

<p style="text-align: right;">Page 230</p> <p>1 the way to the hospital, what scientifically</p> <p>2 does that tell you about days in their</p> <p>3 pregnancy that they took acetaminophen for</p> <p>4 other reasons?</p> <p>5 A. Scientifically you can only</p> <p>6 draw assumptions about their behavior prior</p> <p>7 to that.</p> <p>8 Q. Right.</p> <p>9 We really know nothing other</p> <p>10 than this one snapshot, right?</p> <p>11 A. Quantitatively, we don't know</p> <p>12 behaviors prior to that.</p> <p>13 Q. Okay. By the way, we're</p> <p>14 talking about cord blood now, but on your --</p> <p>15 on Dr. Cabrera's hierarchy, is a cord blood</p> <p>16 study better or less good than a meconium</p> <p>17 study for looking for pregnancy outcomes like</p> <p>18 this?</p> <p>19 A. The, I think, meconium study is</p> <p>20 better.</p> <p>21 Q. Okay. All right. Let's get</p> <p>22 into this a little bit.</p> <p>23 On Table 1, which is on journal</p> <p>24 page 184. Let me know when you're there.</p> <p>25 A. I'm -- Table 1, yes, I'm there.</p>	<p style="text-align: right;">Page 232</p> <p>1 issue, right?</p> <p>2 A. Yes.</p> <p>3 Q. Okay. So no developmental</p> <p>4 issue, only 8.9 percent of them were born</p> <p>5 preterm, right?</p> <p>6 A. That's what it says, yes.</p> <p>7 Q. And then for developmental</p> <p>8 issues, for ADHD and ASD in particular, you</p> <p>9 know, one is double, ADHD is double the</p> <p>10 amount of the percentage of preterm birth,</p> <p>11 and ASD is triple, correct?</p> <p>12 A. Approximately.</p> <p>13 Q. Right.</p> <p>14 And you'd expect that, wouldn't</p> <p>15 you? Because you know that preterm birth is</p> <p>16 one risk of developing ADHD and autism,</p> <p>17 right?</p> <p>18 A. There are potentially</p> <p>19 neurodevelopmental impacts from a preterm</p> <p>20 birth.</p> <p>21 Q. Okay. And in Dr. Cabrera's</p> <p>22 opinion, are those causal, or are those still</p> <p>23 under investigation?</p> <p>24 A. In what capacity?</p> <p>25 Q. Is preterm birth something that</p>
<p style="text-align: right;">Page 231</p> <p>1 Q. Yeah.</p> <p>2 So what this is showing is for</p> <p>3 the 998 mothers who had their cord blood</p> <p>4 taken, this is some of that background</p> <p>5 information on basically demographics, right?</p> <p>6 A. Yes. So it's -- Table 1 is</p> <p>7 titled "Maternal and child characteristics</p> <p>8 according to child physician-diagnosed</p> <p>9 conditions."</p> <p>10 Q. Right.</p> <p>11 And for -- let's look at</p> <p>12 something like preterm birth.</p> <p>13 Are you there?</p> <p>14 A. Yes.</p> <p>15 Q. Okay. So the babies who were</p> <p>16 born preterm have more than double rate --</p> <p>17 actually, sorry.</p> <p>18 The babies who were born</p> <p>19 preterm, about 20 percent of them had ADHD</p> <p>20 and 28 percent had autism, right?</p> <p>21 A. So 28.8 percent had ASD,</p> <p>22 autism, and 20.6 percent had ADHD.</p> <p>23 Q. All right. And that's</p> <p>24 increased over the first column, right? The</p> <p>25 first column is what? It's no developmental</p>	<p style="text-align: right;">Page 233</p> <p>1 can be causally associated with ADHD and</p> <p>2 autism?</p> <p>3 A. I'd say those are associated.</p> <p>4 I don't know that one causes the other.</p> <p>5 Q. Okay. Is that because you</p> <p>6 haven't done a full Dr. Cabrera analysis on</p> <p>7 it yet?</p> <p>8 A. Because as far as I know in the</p> <p>9 literature, there's association, and I</p> <p>10 haven't done the analysis either.</p> <p>11 Q. Okay. And association is not</p> <p>12 causation, right?</p> <p>13 A. Association in itself is not</p> <p>14 sufficient for a causation.</p> <p>15 Q. Okay. Let's look at maternal</p> <p>16 smoking during -- before or during pregnancy.</p> <p>17 Do you see that? It's about</p> <p>18 halfway down the column.</p> <p>19 A. Yes, I do.</p> <p>20 Q. Okay. And for a continuous</p> <p>21 smoker, somebody who smoked throughout</p> <p>22 pregnancy, do you see that about 4 percent</p> <p>23 had no neurodevelopmental issue, 9 percent</p> <p>24 had ADHD, and 10.6 percent had autism, right?</p> <p>25 A. That is correct.</p>

Page 234

1 Q. So smokers had a significant
2 increase in ADHD and ASD as a proportion --
3 as a percentage, right?
4 A. There was a significant
5 difference in regards to smoking --
6 Q. And --
7 A. -- and the outcomes.
8 Q. And that's not a surprise to
9 you because you know that ADHD and autism are
10 caused by smoking, right?
11 A. I would say that there's --
12 there is an association with smoking and
13 autism.
14 Q. Okay. So it's the same answer.
15 There's an association, but you don't know
16 for sure that a mom smoking throughout
17 pregnancy causes autism or ADHD?
18 A. I haven't personally done a
19 Bradford Hill on that, but in regards to
20 smoking, smoking has been contraindicated
21 during pregnancy as associated with various
22 neurodevelopmental and congenital outcomes.
23 Q. Okay. But you're not ready to
24 attribute causation yet, right?
25 A. Well, I would say it's a risk

Page 235

1 factor.
2 Q. Okay. It's a risk factor.
3 In Dr. Cabrera's opinion, is
4 acetaminophen more likely to induce autism in
5 a pregnancy than continuous maternal smoking?
6 A. I would say if you wanted to
7 analyze the risk of autism, you should adjust
8 for maternal smoking as another risk factor
9 because you wouldn't want to influence the
10 outcome.
11 So independently, I haven't
12 compared them quantitatively with each other.
13 Q. But you're going to -- you will
14 stand up and you will tell the judge in this
15 case that acetaminophen causes autism, but
16 you won't stand up and say that continuous
17 smoking during pregnancy causes autism?
18 A. I would say that there --
19 they -- you have to modify as -- is it a risk
20 factor for causing ADHD and ASD if you're
21 analyzing autism. And I'm simply saying I
22 haven't -- I haven't done, nor have I seen, a
23 Bradford Hill on smoking and autism or ADHD
24 as an outcome. I'd have to look at that
25 specifically.

Page 236

1 I haven't -- I haven't asked,
2 and so I can't answer that question.
3 Q. But that's not defending war
4 criminals, right?
5 A. So Philip Morris isn't in the
6 room, so that's -- it depends on who you ask.
7 Q. All right. Let's go on to
8 Table 2.
9 Let me know when you're there.
10 A. I'm there.
11 Q. Okay. So what Ji did is took
12 that -- took the acetaminophen metabolite
13 level in the cord blood from that one
14 snapshot in time at delivery, correct?
15 A. They're analyzing the cord
16 blood that was collected during delivery.
17 Q. And in particular, they're
18 analyzing it for acetaminophen, right?
19 A. Acetaminophen and metabolites
20 of acetaminophen.
21 Q. Right. Right.
22 They're using the metabolite as
23 a proxy for acetaminophen, right?
24 A. Yes. And it's important to
25 note the metabolites also have a longer

Page 237

1 half-life than just acetaminophen as well.
2 Q. Okay. How much longer? Are we
3 talking days?
4 A. Days.
5 Q. Weeks?
6 A. Weeks is probably farther out
7 than the metabolites would be expected, but
8 some of them may be within weeks, not longer
9 than that.
10 Q. Okay. And then what Ji did is,
11 depending on the measurement of the cord
12 blood acetaminophen metabolites, broke it
13 into three groupings. Basically took
14 every -- all 998 measurements, and not
15 everyone had acetaminophen, right?
16 A. Yes.
17 Q. Okay. Took the ones that did,
18 put them all in order, right, from least to
19 most or vice versa, and broke it into three
20 groups, right?
21 A. So it's referred to as
22 tertiles. They've done an analysis and split
23 the group into three based on where they fell
24 within the group.
25 Q. Right.

Page 238

1 But they were even groups.
 2 It's not like there was a threshold for one
 3 group and a threshold for another. They just
 4 broke it into three groups, right?
 5 A. Well, it's a -- how
 6 distributions work, you can just apply a
 7 cutoff, and you end up with thirds based on
 8 the distribution of a normal distribution.
 9 Q. Right.
 10 But it wasn't like we're going
 11 to ignore this group that has -- that has the
 12 low level or anything like that. It was just
 13 three even groups, right?
 14 A. So the group defines what a low
 15 level is.
 16 Q. Okay. And it was broken up
 17 into three levels, right? The third tertile
 18 just meant the high -- the grouping of the
 19 highest levels of cord blood acetaminophen
 20 metabolite, right?
 21 A. Yeah. So they're grouping
 22 based on the tertiles, and the third group
 23 appears to have the highest exposure.
 24 Q. In terms of the cord blood
 25 measurement, right?

Page 239

1 A. Yes.
 2 Q. Okay. So the third group had
 3 the highest exposure for whatever snapshot in
 4 time the cord blood was able to capture
 5 around -- right before delivery, right?
 6 A. Yes.
 7 Q. Okay. And so then if we look
 8 at some measurements, the first tertile, that
 9 ended up being our control, right?
 10 A. Yeah, they're giving that a
 11 measure or odds ratio of 1, so that's our --
 12 becomes our control.
 13 Q. Right. And then so then we
 14 look at the second and third tertile.
 15 And so let's look at, for
 16 example, the first piece of data in here.
 17 It's ADHD and -- in the second tertile for
 18 unchanged acetaminophen.
 19 And that is not statistically
 20 significant, correct?
 21 A. It's an increased risk, 1.48,
 22 but it does cross -- it does cross 1.
 23 Q. Okay.
 24 A. In regards to the confidence
 25 interval.

Page 240

1 Q. And that alone, even
 2 Dr. Cabrera would not say that that is
 3 evidence that you would rely on that ADHD
 4 causes -- or sorry, that acetaminophen causes
 5 ADHD, correct?
 6 A. Well, to be clear, that's one
 7 part of this data.
 8 Q. Yeah.
 9 A. And so if that was the only
 10 part, I would say that it would still be
 11 unclear. But that's -- it's not the only
 12 part. There's also the third tertile where
 13 there's -- where the risk continues to go up,
 14 and that's where we see this
 15 concentration-dependent effect or a
 16 dose-effect with risk.
 17 Q. Yeah.
 18 And so I said that alone, and
 19 you wouldn't rely on that alone. And don't
 20 worry, we're going to go through all of
 21 these.
 22 So back to that second tertile
 23 number. The .92, the way statistics works is
 24 it could very well be that the actual data
 25 there is that the risk effect is .92 below

Page 241

1 the null, correct?
 2 A. There's a miniscule possibility
 3 that it could be 0.92 based on the variation
 4 of the point estimate.
 5 Q. Well, these are statistics. So
 6 define "miniscule."
 7 A. Well, the distribution is the
 8 point estimate of 1.48 is the central
 9 tendency. So that's where you would expect
 10 it to be.
 11 Q. Right.
 12 A. The further you get away from
 13 that, the less is the likelihood that those
 14 numbers represent what the point estimate is;
 15 that the point estimate is the central
 16 tendency.
 17 Q. Right.
 18 And it very well could be
 19 there's a -- there's a small possibility that
 20 it's 2.39, but there's an equally small
 21 possibility that it's 0.92, correct?
 22 A. Within the variation, those are
 23 possibilities.
 24 Q. Okay. And if we look over to
 25 the next column, for autism, and unchanged

<p style="text-align: right;">Page 242</p> <p>1 acetaminophen in the second tertile, we see 2 something similar, right? 1.32, but not 3 statistically significant, correct? 4 A. I see 1.33 for the adjusted 5 odds ratio. 6 Q. Oh, I have a pen mark over 7 mine. So thank you. 8 So then if we go down to -- and 9 then there's -- Dr. Cabrera, there's other 10 measures for the metabolites, right? 11 A. Yes, there are. 12 Q. And there's data reported for 13 each of those, right? 14 A. Yes, there are. 15 Q. So, for example, under 16 glucuronide, one of the metabolites, if there 17 was -- if it was detected -- and it was only 18 detected in 192 of them, right? 19 A. Yes. Any detection, 192. 20 Q. They didn't break this down 21 into tertiles because the numbers were too 22 low, right? 23 A. Well, because there's -- there 24 was a no detection and any detection, and so 25 they broke it down that way.</p>	<p style="text-align: right;">Page 244</p> <p>1 but it was -- it could be considered not 2 statistically significant. 3 Q. Right. 4 And, Dr. Cabrera, just to make 5 this easier, the plaintiffs' counsel is going 6 to have an opportunity to ask you questions 7 after I'm done, so you're going to get to 8 talk about all the things that you think 9 support your opinion, if I forget to ask you 10 about them or choose not to. 11 Okay? 12 If you go down to cord 13 acetaminophen burden, you understand that to 14 be a measure of the unchanged acetaminophen, 15 the glucuronide and the acetyl cysteine 16 metabolite as well, right? The three that 17 they measured? 18 A. The N-acetyl cysteine 19 metabolite? 20 Q. Yeah. 21 A. Okay. I'm looking at that. Do 22 you have a question about it? 23 Q. So -- sorry. We're down in the 24 last section of rows where it says "cord 25 acetaminophen burden"?</p>
<p style="text-align: right;">Page 243</p> <p>1 Q. Because only 192 had any 2 detection. So they didn't break it up 3 because the numerosity wasn't high enough, 4 right? 5 A. Oh, in regards to tertiles? 6 Q. Yeah. 7 A. I can't say the decision on why 8 they didn't break it into tertiles other than 9 the fact that they had a what's referred to 10 as an unexposed group that was no detection. 11 Q. Okay. And if you look across 12 to -- they also measured ADHD and ASD 13 together in the same patient, right? 14 A. They did group them. 15 Q. So in the third column for 16 that, when there's some detection of this 17 metabolite, it was, again, 1.55 from .053 to 18 4.15, not statistically significant, right? 19 A. So to be fair, the adjusted 20 odds ratio for ADHD was significant with an 21 increased risk of 2.25. 22 And the adjusted odds ratio for 23 ASD was also significant for 2.29, but ADHD 24 and ASD, the adjusted odds ratio was 1.55, 25 and it did cross 1. Also an increased risk,</p>	<p style="text-align: right;">Page 245</p> <p>1 A. Okay. Yeah. So you're -- 2 okay. We're skipping over N-acetyl cysteine? 3 Q. Yeah. Yeah, my -- I mean, we 4 can -- we can do it if you want, or you could 5 do it with your counsel later, but I was just 6 going to ask you about the total 7 acetaminophen burden. 8 And my question for you, and I 9 think we got a little confused there, is the 10 total cord acetaminophen burden is all of -- 11 it's the two metabolites they measured plus 12 pure acetaminophen, right? 13 A. My understanding, they are 14 looking at all of the metabolites of 15 acetaminophen in that regard. Total burden. 16 Q. Okay. And if we look in the 17 second tertile for autism and autism and ADHD 18 together, we have positive point estimates 19 that are not statistically significant, 20 right? 21 A. In the second tertile? 22 Q. Yes. For ASD and ADHD with 23 ASD. 24 A. Okay. So just to be clear, the 25 points there for ADHD, there's a significant</p>

<p style="text-align: right;">Page 246</p> <p>1 increased risk for ADHD of 2.26, that's 2 significant statistically; an increased risk 3 or odds ratio of 2.14, that is not 4 statistically significant; and then for ADHD 5 and ASD, the odds ratio is 2.1, and it would 6 be considered not statistically significant. 7 Q. Okay. And in the third 8 tertile, if we look over to ADHD and ASD 9 together, the point estimate is positive, but 10 that one is not statistically significant, 11 correct? 12 A. And, again, for -- to cover all 13 of the data -- 14 Q. Doctor, your counsel -- 15 A. -- the third tertile -- 16 Q. Your counsel's going to -- 17 A. -- in the ADHD is 2.86, and 18 it's statistically significant. For ASD, 19 it's 3.62, and it's statistically 20 significant. But for ADHD and ASD, it is 21 also an increase odds ratio, but it was not 22 statistically significant. But it was an 23 increased odds ratio of 2.44. 24 Q. Okay. And, Doctor, when you 25 were looking at this, did you -- were you</p>	<p style="text-align: right;">Page 248</p> <p>1 Q. Didn't you wonder what changed, 2 which metabolite -- what was the burden of 3 the other two metabolites? 4 A. Inasmuch as we can see that 5 both of the other metabolites showed an 6 increased risk when they were detected, or an 7 increased odds ratio when they were detected 8 for ADHD, it appears that they were 9 driving -- that is, those longer-lived 10 metabolites are -- were driving that 11 increased risk. 12 Q. On a very -- on a comparatively 13 small number of patients, right, compared to 14 the unchanged acetaminophen? 15 A. Well, it's still the total 16 number in the second tertile with the cord 17 acetaminophen burden, but it appears to be 18 enough to move the odds ratio to an increased 19 risk. 20 Q. Have you -- have you talked 21 to -- do you know Yuelong Ji? 22 A. I do not. 23 Q. You've never communicated with 24 Yuelong Ji? 25 A. I did not.</p>
<p style="text-align: right;">Page 247</p> <p>1 able to figure out the percentage of the cord 2 acetaminophen burden that was the metabolites 3 versus the unchanged acetaminophen? 4 A. As far as I know, I didn't see 5 a -- quantitative values for them. 6 Q. It's not reported, right? 7 A. I haven't seen that data. 8 Q. Okay. So you don't know, for 9 example, for ADHD in the second tertile for 10 unchanged acetaminophen, it wasn't 11 statistically significant, but when 12 considering the total burden, it was, 13 correct? 14 A. Can you repeat the question, 15 please? 16 Q. Sure. 17 For ADHD -- for the outcome of 18 ADHD -- 19 A. Okay. 20 Q. -- looking at the second 21 tertile, for unchanged acetaminophen, there 22 was no statistically significant effect, but 23 for total acetaminophen burden for the second 24 tertile and ADHD, there was, right? 25 A. That is correct.</p>	<p style="text-align: right;">Page 249</p> <p>1 Q. Okay. So you didn't ask any 2 questions about this study, I take it? 3 A. I have not asked -- I have not 4 been in communication with the authors. 5 Q. Okay. Did you presume, 6 Dr. Cabrera, that this -- that the 7 acetaminophen present in the cord blood at 8 the time of birth, did you extrapolate that 9 in your causation analysis to the entire 10 pregnancy of this dataset? 11 A. To be clear, I took it at face 12 value in that it shows a 13 concentration-dependent or referred to as a 14 dose-dependent increase in risk. 15 Q. Which could be eliminated, 16 corrupted or completely attenuated in the 17 circumstance I described where a woman was 18 taking acetaminophen for the pains of labor, 19 right? 20 A. Well, you wouldn't expect that 21 to result in an increased risk that was 22 dose-responsive in that regard. 23 Moreover, the fact that there's 24 also increased risks associated with the 25 longer-lived half-lives of the other</p>

Page 250

1 metabolites, including the glucuronide and
 2 the N-acetyl cysteine, which is, at least in
 3 specific cases, would be indicating that it
 4 interacted with glutathione and that it's
 5 actually -- you're detecting acetaminophen
 6 and glutathione in the newborn's cord blood.
 7 Q. Did Ji say that in the study?
 8 A. I'm familiar enough with the
 9 biochemistry to understand that.
 10 Q. You've testified before that
 11 weeks 2 to 4 of the human pregnancy are the
 12 most sensitive to neurodevelopmental outcomes
 13 like autism and ADHD.
 14 Do you recall that?
 15 A. Specifically for neural tube
 16 defects, those are the sensitive window for
 17 neural tube defects.
 18 Q. Okay. You have no idea for
 19 this dataset what acetaminophen, if any, each
 20 of the 998 mothers took during weeks 2 to 4
 21 of their pregnancy, correct?
 22 A. Can you clarify what
 23 acetaminophen, if any?
 24 Q. Well, yes. I'll rephrase.
 25 Dr. Cabrera, for each of the

Page 251

1 998 women whose cord blood were measured in
 2 the study, you don't know if they took
 3 acetaminophen in weeks 2 to 4 of their
 4 pregnancies at all, correct?
 5 A. I have no way of determining
 6 whether they took medication during the first
 7 trimester of pregnancy.
 8 Q. You don't know if they were
 9 exposed to acetaminophen during any of the --
 10 of the relevant periods of brain development
 11 that even you would testify to, other than
 12 this one day before they gave birth, correct?
 13 A. I would say this data is
 14 actually most consistent with a third
 15 trimester exposure. I wouldn't be
 16 comfortable saying that it included any
 17 exposures before that.
 18 Q. You only know that they were
 19 exposed one time within six to eight hours
 20 before the cord blood was taken, right?
 21 A. In regards to the unchanged
 22 acetaminophen, that is the correct
 23 assumption.
 24 In regards to the metabolites,
 25 as I've already indicated, the metabolites

Page 252

1 have a longer half-life, and those wouldn't
 2 be on the order of hours. It would be days.
 3 Q. Right.
 4 And if they -- if the exposure
 5 was days for the longer half-life, it would
 6 be at a very low dose because days before it
 7 would be depleting as the half-lives went,
 8 right?
 9 A. Not necessarily inasmuch as
 10 there's evidence and -- not yet in humans,
 11 but in, I believe, the ewe, which is a --
 12 lamb studies, that showed that these
 13 metabolites may actually be circulating in
 14 the uterine environment and swallowed and
 15 then recirculated by the -- by the developing
 16 fetus.
 17 They can actually by and large
 18 accumulate there.
 19 Q. That's a -- that's a
 20 hypothesis, correct, Dr. Cabrera?
 21 A. That's -- it hasn't been shown
 22 in humans, but it has -- it has been shown
 23 that those metabolites are found in lambs.
 24 Q. Okay. Understanding that
 25 they've been found in lambs, Dr. Cabrera,

Page 253

1 you're not going to testify in front of this
 2 Court that that's a mechanism of action here
 3 that you could say with certainty, correct?
 4 A. I can't say that it works just
 5 like that in humans. There's a study on it
 6 in lambs.
 7 Q. All right. If you turn to
 8 page 187 of this, we're under Limitations.
 9 You see the Ji identified what
 10 we're just talking about, that a limitation
 11 is that it was only a one-time measurement of
 12 acetaminophen, and it at most reflects
 13 maternal use -- may at most reflect maternal
 14 use of acetaminophen during the peripartum
 15 period.
 16 You agree with that, right?
 17 A. As I indicated for free
 18 acetaminophen, that's -- that is correct.
 19 Q. Okay. And Ji doesn't say
 20 anything else about the metabolites, other
 21 than what I just read to you, right?
 22 A. Not that I've read in the
 23 study.
 24 Q. Okay. And one other thing that
 25 Ji says is that liver is the primary location

Page 254

1 for metabolite -- metabolism of
2 acetaminophen.
3 And you don't disagree with
4 that, right?
5 A. The predominant -- the majority
6 of acetaminophen one consumes would be
7 metabolized by the liver, which is why
8 there's increased risk for hepatotoxicity.
9 Q. Okay. And one more question on
10 this, and then we can move on.
11 Yeah, we can take a break.
12 Back on page 181, Ji notes in
13 here -- and this is in 2020 he's noting this.
14 The American Academy of Pediatrics grand
15 rounds concluded there's no definitive causal
16 link between acetaminophen exposure and ADHD.
17 That was in 2020.
18 I take it you disagree now with
19 the American Academy of Pediatrics, right?
20 A. You didn't tell me exactly
21 where you're reading that from.
22 Q. Oh, I apologize, Dr. Cabrera.
23 I use my finger-pointing right here.
24 A. Okay. All right.
25 Q. My question to you is, you

Page 255

1 disagree with the American Academy of
2 Pediatrics as reported by Dr. Ji here, right?
3 A. I -- inasmuch as this is part
4 of the introduction, they're saying prior to
5 this study that the American Academy of
6 Pediatrics grand rounds concluded that there
7 was no definitive causal link between
8 acetaminophen exposure and ADHD.
9 MR. MURDICA: Okay. We can
10 take a break. Thank you, Dr. Cabrera.
11 VIDEOGRAPHER: Off the record,
12 2:21.
13 (Off the record at 2:21 p.m.)
14 VIDEOGRAPHER: The time is
15 2:41 p.m. Back on the record,
16 beginning of Media 5.
17 QUESTIONS BY MR. MURDICA:
18 Q. Welcome back, Dr. Cabrera.
19 Are you ready to proceed?
20 A. Yes, I am.
21 Q. Okay.
22 MR. TRACEY: How about sound?
23 I need the sound on.
24 MR. MURDICA: Oh, I'm muted.
25 All right.

Page 256

1 MS. KING: How's that?
2 MR. TRACEY: Yeah, that's good.
3 It was nothing. Now it's something.
4 MR. MURDICA: I tried. Didn't
5 work.
6 QUESTIONS BY MR. MURDICA:
7 Q. All right. Dr. Cabrera, are
8 you ready to proceed?
9 A. Yes, I am.
10 Q. Okay. Earlier this morning
11 when we talked about the various reports
12 you've submitted, two of them were your
13 original report, and then the amended report
14 you submitted a week later.
15 Do you remember those
16 questions?
17 A. Yes, I do.
18 Q. Okay. And your testimony was
19 that you made some typographical changes but
20 nothing substantive, right?
21 A. That's correct.
22 (Cabrera Exhibits 11 and 12
23 marked for identification.)
24 QUESTIONS BY MR. MURDICA:
25 Q. Okay. Marked as Exhibit 11 and

Page 257

1 12 are your original report and your amended
2 report.
3 Do you have those in front of
4 you now, Doctor?
5 A. Yes, I do.
6 Q. Okay. What I'd like you to do
7 is turn to page 135 in the original report,
8 which is the taller stack.
9 A. Okay.
10 Q. Okay. Let me know when you're
11 there.
12 A. I'm there.
13 Q. Okay. You have a section,
14 weight of evidence for the APAP, ASD studies?
15 A. Yes.
16 Q. Okay. And then you have a
17 chart on the next page.
18 A. Yes.
19 Q. Do you see that?
20 A. Yes.
21 Q. Okay. Now, I want you to open
22 the amended report to the same section --
23 A. Okay.
24 Q. -- which I think is -- you got
25 it?

Page 258

1 A. Yes.

2 Q. Okay. In the chart on the

3 amended report, is the Saunders study in

4 there?

5 A. I do not see it.

6 Q. Is it on the original?

7 A. I -- yes, it is.

8 Q. And in the original, it's in

9 the chart, and then if you look at the text

10 following it, turn -- if you turn the page --

11 A. Oh, yeah.

12 Q. -- there's a description of

13 Saunders as well, right?

14 A. Yeah, I think it was a -- it

15 was a typo because there's not a description

16 of Saunders.

17 Q. Okay. Dr. Cabrera, Saunders

18 didn't help you, right?

19 Saunders found no correlation

20 between acetaminophen exposure and autism,

21 correct?

22 A. Well, it's two different

23 questions. Which one do you want me to

24 answer?

25 Q. Okay. How about this? I'll

Page 259

1 start over.

2 Saunders found no correlation

3 between acetaminophen exposure in utero and

4 autism, correct?

5 A. They did not.

6 Q. Okay. And you had it in your

7 original report, correct?

8 A. Yes, it was.

9 Q. And then it is -- it is not in

10 your current report, correct?

11 A. That's correct.

12 Q. Okay. And you only made

13 typographical changes in your amended report,

14 correct?

15 A. Yes. And to clarify, the

16 information that's listed there with Saunders

17 is not the correct Saunders information, so

18 that's why it was removed. That is, the

19 information that follows Saunders is not

20 Saunders information.

21 Q. Okay. What is it?

22 A. I believe that's actually a

23 spillover from Liew.

24 Q. Okay. So Saunders 2019

25 shouldn't have been in there from the start?

Page 260

1 A. Yes, exactly.

2 Q. You weren't cherry-picking data

3 and realized you didn't like it?

4 A. It wasn't about cherry-picking

5 data. It was just that the -- when I was

6 formatting the table, that should have been a

7 Liew citation with a hyperkinetic syndrome,

8 and it ended up being a Saunders.

9 Q. And somehow the word "Saunders"

10 just showed up there?

11 A. Well, I was reviewing the

12 Saunders work as well, and that's how it

13 ended up in the table.

14 Q. So it turns out Saunders is not

15 considered in your weight of evidence,

16 correct?

17 A. It was part of my analysis.

18 Q. It was?

19 A. Yes.

20 Q. But now it's no longer in the

21 section on weight of evidence?

22 A. Well, no longer in that they

23 didn't have a significant increase in risk in

24 that section.

25 Q. So because they didn't have a

Page 261

1 significant increase in risk, it wasn't

2 included in your weight of evidence?

3 A. It was part of the weight of

4 evidence.

5 In regards to that particular

6 study, it was referencing the wrong study,

7 and so that's the reason why Saunders was

8 removed.

9 Q. Do you recall any other

10 substantive changes you made in your amended

11 report?

12 A. That wasn't substantive --

13 MR. TRACEY: Objection to form.

14 THE WITNESS: It was the fact

15 that it wasn't referencing the right

16 material too.

17 QUESTIONS BY MR. MURDICA:

18 Q. Do you recall changing your

19 description of Baker 2020?

20 A. There -- for the tables,

21 there were other editorial typos in the

22 tables that I had to correct as well.

23 Q. Okay. But it included

24 substance, right?

25 A. Well, you know, inasmuch as the

<p style="text-align: right;">Page 262</p> <p>1 name was referencing the wrong study or the 2 study didn't match the reference, those had 3 to be corrected. There were, you know, 4 editorial changes because it -- basically I 5 typed the wrong name there. 6 Q. And now I'm asking you about 7 something different now, Dr. Cabrera. You 8 also made changes, additions, substantive 9 additions, in your description of the 10 meconium study, right? 11 A. I mean, if we want to look at 12 those particularly, we can discuss them. 13 Q. I'm asking if you remember. 14 Do you remember that? 15 A. I did make some other changes 16 in regards to similar problems with the 17 tables that I had to correct. 18 Q. Okay. You don't recall making 19 any other changes than to two tables? 20 A. I just said I had to make 21 similar changes to tables that -- 22 Q. Right. Sorry. You know what, 23 that was a poor question. 24 Other than changes to tables, 25 you don't recall making any other substantive</p>	<p style="text-align: right;">Page 264</p> <p>1 description, right above results, you don't 2 have anything -- or sorry. 3 Do you see the limitation 4 section? 5 A. On 138? 6 Q. Yeah, in your original report. 7 A. Yes. 8 Q. Okay. Compare that to your 9 amended report. 10 A. I did add additional 11 information regarding the meconium. 12 Q. Okay. So that was -- that was 13 not an adjustment to a table, right? That 14 was a substantive change, Doctor. 15 A. Well, I don't know about 16 substantive. It was just to define what the 17 exposure in meconium represents. 18 Q. It would also offer as an 19 opinion about what meconium can capture, 20 correct? 21 A. Well, it's more or less by 22 definition of what meconium has been reported 23 to capture, but I didn't include a reference 24 in that regard. It's just generally 25 understood.</p>
<p style="text-align: right;">Page 263</p> <p>1 changes in your amended report. 2 Is that fair? 3 A. I didn't make substantive 4 changes. It was -- these were typos on my 5 part where I had referenced the wrong study 6 with the wrong data. 7 Q. Okay. You can put those aside 8 for now. 9 Oh, you know what, while you 10 have it, turn to page 136 in the original 11 report. Where's the current report? This is 12 the original. Where's the current? This is 13 the current? 14 Okay. If you -- in your 15 description -- in your original report, 16 Exhibit 11, on page 138, you have a 17 description of Baker, right? 18 A. Yes. 19 Q. Okay. And then in your amended 20 report, on page 138, you have a description 21 of Baker. 22 Right? 23 A. Yes. 24 Q. Okay. Now, if you look at the 25 third paragraph from the bottom of your</p>	<p style="text-align: right;">Page 265</p> <p>1 Q. It's not -- was not -- was not 2 a typo and was not fixing a table with a 3 typo, correct? 4 A. That is correct. 5 Q. Okay. All right. Let's move 6 on. 7 In study design, one thing that 8 can account for something like genetics, 9 which here is -- well, you agree that for ASD 10 and ADHD, genetics is, even you'd agree, the 11 predominant influence on the outcome, right? 12 A. It depends on the case. 13 Q. Okay. It has 80 to 90 percent 14 inheritability, right, both ASD and ADHD? 15 A. In twinning studies, there have 16 been some studies that have reported 17 inheritability as high as 80 or 90 percent. 18 Q. Okay. One way in a study 19 design to account in a situation like this 20 where you'd expect a large genetic component 21 is to have sibling controlling, right? 22 A. That is a potential study 23 design for controlling such things. 24 Q. And one sibling would have been 25 exposed to an outcome -- sorry, to an</p>

Page 266

1 exposure. The other would not have. And you
 2 see if they end up having the same or
 3 different outcomes, right?
 4 A. So based on what's referred to
 5 as discordant siblings, you can perform an
 6 analysis that way.
 7 Q. Yeah.
 8 And you looked at a study that
 9 did just that with respect to human beings
 10 and ADHD, correct?
 11 A. I did.
 12 Q. And what's it called?
 13 A. It was -- I assume you're
 14 referring to the Gustavson study.
 15 Q. I am.
 16 MR. MURDICA: We'll take --
 17 we'll mark it as Exhibit 13.
 18 MR. TRACEY: What exhibit
 19 number?
 20 MR. MURDICA: 13.
 21 (Cabrera Exhibit 13 marked for
 22 identification.)
 23 QUESTIONS BY MR. MURDICA:
 24 Q. Now, Dr. Cabrera, this dataset,
 25 the same dataset had previously been examined

Page 267

1 by the same authors and found an association
 2 between ADHD and acetaminophen exposure in
 3 the Norwegian health care database, right?
 4 A. Yes, they have.
 5 Q. And this Gustavson study
 6 incorporated a sibling control design like we
 7 just discussed, right?
 8 A. This study did, as did the
 9 previous study.
 10 Q. And when -- and the previous
 11 study, you're referring to Ystrom, right?
 12 A. Yes.
 13 Q. Okay. And in Gustavson, when
 14 the sibling control was looked at, the effect
 15 of acetaminophen in correlation with the
 16 outcome of ADHD was completely attenuated or
 17 went away in layman's terms, right?
 18 A. So to be clear, under the --
 19 long-term exposure was associated with a
 20 twofold increased risk of ADHD diagnosis, and
 21 the adjusted hazard ratio is 2.02,
 22 statistically significant.
 23 In the sibling control model,
 24 the association between long-term
 25 acetaminophen use and ADHD in the child was

Page 268

1 an adjusted hazard ratio of 2.77, was
 2 statistically significant.
 3 At the between family level,
 4 the -- and adjusted hazard ratio of 1.06,
 5 which was not statistically significant, the
 6 confidence interval was 0.51 to 2.05 at the
 7 within family level.
 8 Q. Right.
 9 And you agree that a sibling --
 10 a sibling -- a controlled study is better
 11 than an uncontrolled study, right?
 12 A. I generally teach the
 13 controls -- having controls is important for
 14 studies.
 15 Q. And sibling control in
 16 pregnancy outcomes is one manner of control,
 17 right?
 18 A. That is an approach to doing
 19 these studies.
 20 Q. Okay. And that result, even to
 21 the authors here, was surprising, right?
 22 MR. TRACEY: Object to form.
 23 THE WITNESS: What do you mean
 24 by that result?
 25

Page 269

1 QUESTIONS BY MR. MURDICA:
 2 Q. Did the -- when sibling control
 3 was applied, even though in Ystrom, it didn't
 4 attenuate the effect. In Gustavson in the
 5 same database on the same data with it just
 6 more updated, it did, right?
 7 Would you like me to --
 8 A. My reading of this is they
 9 indicate that these results must be
 10 interpreted with caution and need to be
 11 replicated in other studies.
 12 Q. And while we're on that topic,
 13 replication is one of the most important
 14 things you can have when trying to determine
 15 a causation of an effect to an exposure,
 16 correct?
 17 A. Just to clarify, replication
 18 is important, yes.
 19 Q. Okay. Isn't that one of the
 20 things you most try to do in order to prove
 21 an effect?
 22 A. Generally in science you expect
 23 results to be repeatable.
 24 Q. Right.
 25 Okay. And so if you look at

<p style="text-align: right;">Page 270</p> <p>1 Table 2 on page 7 of 10 of Exhibit 13, you 2 would see that when you look at acetaminophen 3 use of 29 days or more and its correlation 4 with ADHD, it was 2.02, and it was 5 significant, right? That would be the fourth 6 column over. 7 Model 2 -- you can look at 8 model 1 unadjusted or model 2 adjusted. Both 9 found a positive correlation or an 10 association that was significant, right? 11 A. They're both reporting a 12 significant increase -- 13 Q. Right. 14 A. -- in the hazard ratio. 15 Q. And then if you look at the -- 16 when sibling control was applied in the next 17 column over, regardless of the number of days 18 acetaminophen was used during pregnancy, 19 the -- there's no effect, and it's not 20 significant, right? 21 A. When they controlled for family 22 effect, the hazard ratio was 1.06 and was not 23 significant. 24 Q. And if you look at the two rows 25 above that, for lower durations of use of</p>	<p style="text-align: right;">Page 272</p> <p>1 Q. Well, we know of siblings, 2 right -- if you look at a pair of siblings, 3 or a dyad or triad or whatever you want to 4 call it, we know in this study what was 5 looked at was one that was -- the same 6 mother, right? This was not an adoption 7 study? 8 A. (Witness nods head.) 9 Q. They both had the same mother, 10 correct? 11 You've got to say it for the 12 transcript. 13 A. Yes. My understanding is 14 they both have the same mother at least. 15 Q. One was exposed to 16 acetaminophen during the pregnancy, and one 17 was not, correct? 18 A. So to be clear, that's based on 19 the reporting. Even that is a problem with 20 the sib-pair design in that it's more likely 21 that the exposure would be both, but they're 22 reported as discordant. And that's potential 23 grounds for error as well in these studies. 24 Q. Every study that you rely on in 25 your analysis, Dr. Cabrera, relies on</p>
<p style="text-align: right;">Page 271</p> <p>1 acetaminophen in the pregnancy, it's the 2 same, right? There's not a positive effect, 3 and it's not significant, right? 4 A. That is correct. 5 Q. Okay. And that, to a 6 geneticist or somebody who speaks about 7 genetics like yourself, when you have a 8 complete attenuation of a large -- a 9 statistically significant effect by applying 10 sibling control, that speaks to this being a 11 genetic -- a genetic cause, does it not? 12 A. It does not specifically speak 13 to that. And there's multiple reasons for 14 that. 15 To begin with, when adjusting 16 for these sibling control, you're only 17 adjusting for those factors that are shared. 18 You're not adjusting for those factors that 19 may be unshared, and it's one of the 20 weaknesses with these studies. 21 Q. Okay. 22 A. So unshared environmental 23 factors between the two individuals that are 24 discordant is a problem because you're 25 missing them.</p>	<p style="text-align: right;">Page 273</p> <p>1 reported acetaminophen usage, does it not? 2 A. That is correct, and that 3 generally biases towards the null. And so 4 the criticism there is actually that that 5 would bias the study toward the null. In all 6 of those studies as well. 7 Q. According to Dr. Cabrera. 8 A. According to statistics and 9 epidemiology. 10 Q. Everybody who reported 11 acetaminophen usage in the studies was doing 12 so based on memory, correct? 13 A. I mean, could have been an app 14 on their phone. I don't know exactly what 15 their recollection was based upon. A lot of 16 them are referred to as recall. So however 17 manner of recall that they used to recall 18 what they had taken previously. 19 Q. And like this study, they 20 generally lump the days together into the 21 number of days' use without regard for 22 whether it was at day 47 or day 90 of 23 pregnancy, right, or later? 24 A. As far as the exposures go, 25 they lump, you know, 1 through 7 days and 8</p>

Page 274

1 through 28 days together and then more than
2 29 days together.

3 Q. And you, Dr. Cabrera, as a
4 teratologist, would be much more interested
5 in data that actually identified the days and
6 the lengths of exposure for each particular
7 day in pregnancy, correct?

8 A. The -- I would like -- I would
9 like data that showed the particular time
10 during pregnancy and what's also referred to
11 as dose and duration as well. And so --

12 Q. It would be much more -- oh,
13 sorry, go ahead.

14 A. And so this is showing duration
15 but not necessarily the dose during that
16 duration.

17 Q. And most -- if we looked at
18 every study in your report that evaluated
19 human data, most of them -- not all of them,
20 but most of them did just this, right?

21 A. That is to say other studies
22 also reported dose based on duration.

23 Q. Right.

24 And it would be much more
25 illuminating for you as a teratologist to see

Page 275

1 exactly what the pregnancy was exposed to at
2 the exact morphological time of the embryo,
3 correct?

4 A. I would say it would be more
5 informative to have both dose and duration,
6 but duration is -- can also be considered a
7 dose in that it's a longer period of
8 exposure.

9 Q. Right.

10 But seven days, Dr. Cabrera, if
11 it was, you know, pregnancy day 3 to 4 and
12 then not again for four months for one day
13 and not again for three months for one day,
14 that's not really meaningful to you as a
15 teratologist, right?

16 A. When the seven -- or one to
17 seven-day exposure occurs would also be
18 informative.

19 Q. Right.

20 Okay. So back to the sibling
21 control. You are criticizing the sibling
22 control design, but it's better than no
23 control, right?

24 A. Well, if you're overcorrecting
25 and you're biasing towards the null, that's a

Page 276

1 potential problem as well, and inasmuch as in
2 their unadjusted model and their adjusted
3 model, there's increased risk -- there's
4 cause for concern that they may be
5 overadjusting, as I already mentioned, in
6 regards to unshared environment variables.

7 Q. Unless Dr. Chung is right and
8 this is a genetic disease, right,
9 Dr. Cabrera?

10 A. There's no data to show that
11 this is strictly a genetically caused
12 disease.

13 Q. Okay. Did you rely on any
14 other sibling-controlled studies?

15 A. I did review the previous
16 Gustavson study, the group that preceded this
17 one.

18 Q. Yeah. It was Brandlistuen. I
19 said it wrong before. Brandlistuen, not --

20 A. Yes. And I also reviewed
21 Brandlistuen as well.

22 Q. Okay. And this could not -- on
23 the same dataset, this didn't replicate
24 Brandlistuen on sibling control, right?

25 A. Well, to be clear, Brandlistuen

Page 277

1 actually looked at different endpoints. And
2 so there were some overlapping endpoints, but
3 they also looked at different endpoints.

4 Q. Okay. And Gustavson explains
5 why the outcome was different this time,
6 right?

7 A. They do have some -- they
8 propose some reasons why they may have been
9 different, and one of them was also loss of
10 power because it's based on the discordant
11 siblings that have the particular outcomes.

12 Q. And the passage of time and the
13 improvement of monitoring and things like
14 that, right?

15 A. Potentially.

16 Q. Okay. Even though you
17 criticize sibling control, regulatory
18 authorities recognize it as a -- something
19 that is positive for trying to find a real
20 association versus a non-real association,
21 correct?

22 A. I don't agree with that.

23 Typically, it's actually the adoption studies
24 that carry the most weight in regards to
25 separating gene environment interactions, not

<p style="text-align: right;">Page 278</p> <p>1 sibling-based designs.</p> <p>2 Q. Yeah, I didn't say which were</p> <p>3 the best. I said, you are aware that</p> <p>4 regulatory bodies recognize sibling-control</p> <p>5 as superior to not using sibling-controlled,</p> <p>6 correct?</p> <p>7 A. I'm not aware of that.</p> <p>8 Q. Okay. And did you find any</p> <p>9 adoptive studies that evaluated acetaminophen</p> <p>10 exposure?</p> <p>11 A. I did not.</p> <p>12 Q. Did you read Dr. Chung's</p> <p>13 report?</p> <p>14 A. I have.</p> <p>15 Q. Okay. Did you see her citation</p> <p>16 to an adoption study?</p> <p>17 A. I -- if I did, I hadn't --</p> <p>18 didn't notice she had a reference to an</p> <p>19 adoption study.</p> <p>20 Q. Okay. In your work, Doctor, on</p> <p>21 SSRIs for the plaintiff's Bar, did you</p> <p>22 encounter what the European regulatory</p> <p>23 authorities said about the association or</p> <p>24 lack thereof between SSRIs and autism?</p> <p>25 A. I'm not familiar with the</p>	<p style="text-align: right;">Page 280</p> <p>1 it's 27 of the document on the bottom. It</p> <p>2 says 27 of 140. They agreed that sibling</p> <p>3 study design to be the most appropriate to</p> <p>4 examine such risks in relation to exposure</p> <p>5 during pregnancy.</p> <p>6 And I take it you dis -- you've</p> <p>7 just testified you disagree with that, right?</p> <p>8 A. As I indicated, there is risk</p> <p>9 for biasing towards a null with those study</p> <p>10 designs.</p> <p>11 Q. Okay. You don't have better</p> <p>12 data that's better controlled than what we</p> <p>13 just looked at in Gustavson, correct?</p> <p>14 A. Is this a quality assessment?</p> <p>15 I don't have other sib-paired data in that</p> <p>16 regard. I think as far as dose effects, we</p> <p>17 can look at Baker and Ji, and they provide</p> <p>18 very strong data in regards to those types of</p> <p>19 interactions.</p> <p>20 Q. Right.</p> <p>21 But just in a human study like</p> <p>22 Gustavson, you don't have better control than</p> <p>23 the sibling control present in Gustavson,</p> <p>24 right?</p> <p>25 If you do, point me to it.</p>
<p style="text-align: right;">Page 279</p> <p>1 European statement on that regard.</p> <p>2 Q. Okay. Did you ever render an</p> <p>3 opinion that SSRIs cause autism?</p> <p>4 A. I have not.</p> <p>5 Q. Okay. Did you ever render an</p> <p>6 opinion that SSRIs cause ADHD?</p> <p>7 A. I have not.</p> <p>8 (Cabrera Exhibit 14 marked for</p> <p>9 identification.)</p> <p>10 QUESTIONS BY MR. MURDICA:</p> <p>11 Q. Doctor, I've marked as</p> <p>12 Exhibit 14 a PRAC document. You may not be</p> <p>13 familiar with what PRAC is, but it's a risk</p> <p>14 assessment committee from the European</p> <p>15 Regulatory Authority.</p> <p>16 And do you have that in front</p> <p>17 of you?</p> <p>18 A. Yes, I do.</p> <p>19 Q. And I only marked it because</p> <p>20 they were looking -- and I know you've opined</p> <p>21 on SSRIs before. They were looking at</p> <p>22 whether SSRIs can cause autism, and they</p> <p>23 determined that it -- the evidence does not.</p> <p>24 But in the context of a drug</p> <p>25 exposure and autism, they suggest on page --</p>	<p style="text-align: right;">Page 281</p> <p>1 A. Well, I think the unmatched</p> <p>2 control in Gustavson itself speaks for itself</p> <p>3 in regards to that it demonstrates that</p> <p>4 there's an increased risk. The application</p> <p>5 of the sib-pair, or particularly the</p> <p>6 in-family design, as I've already indicated,</p> <p>7 can bias towards the null, and that's a --</p> <p>8 that's a cause for concern.</p> <p>9 Q. And your testimony here is that</p> <p>10 you believe it did bias towards the null, so</p> <p>11 you do not accept it in your analysis,</p> <p>12 correct?</p> <p>13 A. Oh, I accept it, but I accept</p> <p>14 it with the understanding that that's one of</p> <p>15 the risks of doing the sib-pairing design.</p> <p>16 Q. Okay. That it is your</p> <p>17 belief -- Dr. Cabrera believes that a</p> <p>18 sib-pair design has a risk that it biases</p> <p>19 towards the null, right?</p> <p>20 A. That's correct.</p> <p>21 Q. And did Dr. Cabrera do any</p> <p>22 analysis whether that, in fact, happened in</p> <p>23 Gustavson?</p> <p>24 A. Simply I went over their data</p> <p>25 analysis and noticed the design that they've</p>

<p style="text-align: right;">Page 282</p> <p>1 undertaken and what happened when they</p> <p>2 applied the model. And so that is a concern</p> <p>3 with sib-pair design that's understood,</p> <p>4 generally, as in reference to my report as</p> <p>5 well.</p> <p>6 Q. All right. Did you call on</p> <p>7 that group at all? Did you contact them in</p> <p>8 any way?</p> <p>9 A. I have not.</p> <p>10 Q. Okay. Did you let them know</p> <p>11 your feelings that what it reflects instead</p> <p>12 is bias?</p> <p>13 A. I wasn't opining about my</p> <p>14 feelings.</p> <p>15 Q. Okay. Well, I mean, if you're</p> <p>16 genuinely concerned about what you think is</p> <p>17 causation, wouldn't you go try to tell</p> <p>18 people, talk to the -- talk to the scientists</p> <p>19 who found the opposite?</p> <p>20 A. If I thought they had an error</p> <p>21 in the study, then I may reach out to them,</p> <p>22 if not the editor; more likely the authors</p> <p>23 first. But it's not that it's an error, I</p> <p>24 think it's even understood by the people</p> <p>25 conducting the study that that is a risk.</p>	<p style="text-align: right;">Page 284</p> <p>1 of it.</p> <p>2 Q. And you came to the opposite</p> <p>3 conclusion of what Gustavson came to in your</p> <p>4 final analysis, correct?</p> <p>5 A. My --</p> <p>6 MR. TRACEY: Object to the</p> <p>7 form.</p> <p>8 Robert, read him the conclusion</p> <p>9 of the authors so we can disavows</p> <p>10 {sic} everybody of what they actually</p> <p>11 said instead of Murdica's version.</p> <p>12 MR. MURDICA: Hey, Sean, if you</p> <p>13 want to testify, I'll put you under</p> <p>14 oath. But you can't tell the witness</p> <p>15 where to go and what to do in the</p> <p>16 middle of an examination whether</p> <p>17 you're here or not. I'm sorry, but</p> <p>18 you can't.</p> <p>19 MR. TRACEY: Okay. Then I'll</p> <p>20 object to the form. You're</p> <p>21 misrepresenting what the authors said.</p> <p>22 And the easiest way to do this is to</p> <p>23 look at what they said.</p> <p>24 MR. MURDICA: Okay. Thank you,</p> <p>25 Sean. I appreciate the advice. Send</p>
<p style="text-align: right;">Page 283</p> <p>1 Q. Okay. You have no specific</p> <p>2 facts based on Gustavson to challenge the</p> <p>3 sibling control. You just have concerns</p> <p>4 generally about the methodology and bias,</p> <p>5 right?</p> <p>6 A. No. Gustavson, I think,</p> <p>7 identifies that that's a potential risk in</p> <p>8 the study itself, and I'm happy to find that</p> <p>9 for you.</p> <p>10 Q. Potential risk, right?</p> <p>11 A. Potential risk, yes.</p> <p>12 Q. Okay. So how did you -- how</p> <p>13 did that factor into your analysis, something</p> <p>14 that powerful? Did you write it off?</p> <p>15 A. I wrote up the Gustavson study.</p> <p>16 It's in my report.</p> <p>17 Q. You wrote it up, or you wrote</p> <p>18 it off?</p> <p>19 A. No, I wrote the study up in my</p> <p>20 report.</p> <p>21 Q. Okay. Okay. But then you</p> <p>22 discredited the findings.</p> <p>23 A. I didn't discredit them. I</p> <p>24 weighed them based on my understanding of</p> <p>25 that study design and potential limitations</p>	<p style="text-align: right;">Page 285</p> <p>1 me a bill.</p> <p>2 QUESTIONS BY MR. MURDICA:</p> <p>3 Q. All right. Dr. Cabrera, where</p> <p>4 publicly have you ever espoused your view</p> <p>5 that sibling-control design is not a good way</p> <p>6 to control a study because of the risk of</p> <p>7 bias?</p> <p>8 A. I haven't performed a sib-pair</p> <p>9 design myself, and so that's not something I</p> <p>10 needed to voice publicly. But there's</p> <p>11 literature in that, both in the reference</p> <p>12 literature and in the published literature,</p> <p>13 about limitations, and I reference that in</p> <p>14 my report as well.</p> <p>15 Q. Okay.</p> <p>16 A. My supplemental report.</p> <p>17 Q. You, Dr. Cabrera, haven't</p> <p>18 published any such thing, correct?</p> <p>19 A. Not specifically in that</p> <p>20 regard, I have not published on that.</p> <p>21 Q. All right. Let's talk a little</p> <p>22 bit about dose.</p> <p>23 You, Dr. Cabrera, used FDA</p> <p>24 guidance to calculate an animal equivalent of</p> <p>25 a human equivalent dose, correct?</p>

<p style="text-align: right;">Page 286</p> <p>1 A. I calculated an animal 2 equivalent dose. 3 Q. Right. 4 A. And I also calculated a human 5 equivalent dose. 6 Q. Right. 7 And I saw in your rebuttal 8 report that you acknowledged, I believe -- 9 well, let me ask you this. 10 Do you acknowledge that the 11 guidance that you cited was for calculating 12 an initial safe dose for a first-in-human 13 trial -- 14 A. That -- 15 Q. -- where there's only animal 16 evidence available? 17 A. That is one application of that 18 calculation. 19 Q. Well, it's the very title of 20 the document. That's what it says it's for, 21 right? 22 A. As I indicated, it is the title 23 of the document. 24 Q. Okay. And you, Dr. Cabrera, 25 then took, even though there's human data,</p>	<p style="text-align: right;">Page 288</p> <p>1 not because it's abused or taken with 2 something else? 3 A. Because even at clinically 4 recommended dosages, there's been reports of 5 increase in liver enzymes consistent with 6 liver damage. 7 Q. Dr. Cabrera, regardless of what 8 you think of the approved dose -- and I agree 9 every regulator in the world disagrees with 10 you, and you're entitled to your opinions, 11 but I'm entitled to ask about them. 12 There is an approved, safe 13 human dose, correct? 14 A. There is a recommended dose. 15 Q. Okay. And the guidance that 16 you're using is for when there's not a 17 recommended human dose, correct? 18 A. The title of that document is 19 in regards to selecting a dose using 20 allometric scaling between an animal and a 21 human. 22 Q. Okay. So when you already know 23 the human dose, why not -- why are you still 24 using the model for calculating a safe dose 25 for a first-in-human trial?</p>
<p style="text-align: right;">Page 287</p> <p>1 you reverse-engineered it back to mouse dose 2 to determine what a safe dose was, right? 3 A. There's no reverse-engineering. 4 It's simply math. You can multiply or you 5 can divide, and you can then use the scaling 6 between animals and humans to determine 7 whether it's a human equivalent dose or an 8 animal-equivalent dose. 9 Q. Right. 10 But in this instance, 11 acetaminophen has been -- we're not doing 12 first-in-human trials, right? 13 A. It was not a first-in-human 14 trial. 15 Q. We know what a safe human dose 16 is, right? 17 A. That's open for debate. 18 Q. Okay. Well, for 60-plus years, 19 our regulatory authorities have told us what 20 a safe human dose is, right? 21 A. And they apparently got that 22 wrong, but that's the reason why it's the 23 most frequently caused cases of acute liver 24 failure. 25 Q. Because the dose is wrong and</p>	<p style="text-align: right;">Page 289</p> <p>1 A. Because allometric scaling 2 still applies. 3 Q. Okay. Is this -- is this FDA 4 guidance? Have you used it ever outside the 5 context of litigation? 6 A. I mean -- just using as an 7 example, this is -- actually, it's not even 8 open for debate. If you look at the label in 9 the Ofirmev, which I've also referenced, and 10 I think we would all agree that at this time, 11 they understood what a recommended dose was. 12 They used the example here in mice of 357 mgs 13 per kg per day, 715 mgs per kgs per day, and 14 1,430 mgs per kgs per day. 15 And then they report that as, 16 "These doses are approximately 0.43, 0.87 and 17 1.7 times the maximum human daily dose 18 respectively based on a body surface area 19 comparison." 20 That is allometric scaling. 21 Q. Okay. Did I ask you about 22 that, whatever you're reading? 23 A. That's exactly what you just 24 asked me about. 25 Q. Okay. Can I have that folder?</p>

<p>Page 290</p> <p>1 What else do you have over 2 there? 3 A. I've already showed you. This 4 is my documents that I've already referenced 5 in my report. 6 Q. Okay. 7 A. I gave you the ones that you 8 don't have. And you have that label. 9 Q. Okay. So this is -- you're 10 referencing a label for acetaminophen that 11 doesn't get processed by the liver? 12 A. It's a IV acetaminophen. 13 Q. Right. 14 A. And part of the utility in that 15 calculation would also include an injection 16 volume, if you wanted to do the calculation 17 that way. 18 Q. Doctor, you can use whatever 19 tortured method you want. I just got to get 20 a record on it. 21 So you just showed me an IV 22 application, right? 23 A. So to be clear, the dosing 24 there is an oral dose that's using allometric 25 scaling.</p>	<p>Page 292</p> <p>1 A. Yes. That is -- this is the 2 standard. As it was written into that label, 3 that is what is used. 4 Q. Okay. When have you used this 5 guidance that we're talking about to 6 calculate a first-in-human dose? 7 A. Well, not a first-in-human 8 dose. I use the table for allometric 9 scaling. It's literally posted on my wall at 10 work, and we use it to adjust doses. It's 11 based on human exposures to convert them to 12 animal dosages. 13 Q. Okay. And you don't look at 14 the recommended -- what do you look at, the 15 recommended human dose -- 16 A. Yes. 17 Q. -- of an approved drug? 18 A. Yes. 19 Q. Okay. You've never used it in 20 the way that the guidance is spelled out; in 21 other words, for first-in-human? 22 A. We use the allometric scaling 23 table, which is consistent with the way it's 24 used in the literature, which is consistent 25 with the way it's used in other labels, if</p>
<p>Page 291</p> <p>1 The label is for an IV drug. 2 The maximum recommended human dose is based 3 on oral exposure, and the data that they're 4 studying is at animal oral exposure -- 5 Q. I -- 6 A. -- based on a NTP guideline 7 study. 8 Q. I agree it's based on oral 9 exposure. 10 IV medication does not first 11 get processed through the small intestine and 12 absorbed into the liver -- absorbed through 13 the small intestine and processed first in 14 the liver, correct? 15 A. Yes, that is correct. 16 Q. Okay. 17 A. That had nothing to do with 18 allometric scaling. 19 Q. Have -- do you know of -- my 20 original question was whether, outside of the 21 context of litigation, you've used this FDA 22 guidance to calculate either a human dose or 23 an animal dose. And I don't think -- I don't 24 think you answered that. 25 What's your answer?</p>	<p>Page 293</p> <p>1 you go and you look through the literature. 2 Even for the acetaminophen 3 label, they're using allometric scaling to 4 determine the maximum human daily dose and 5 then convert that to an animal equivalent 6 dose. 7 Q. And you saw that all of our -- 8 all of the defense experts criticized your -- 9 the way you calculated the animal dose and 10 said that you're essentially giving them 11 toxic doses, right? You just disagree? 12 A. Well, they suggested that 13 applying a safety factor would be required 14 for just the allometric scaling, and you 15 don't need an allometric scaling. 16 The whole idea to find a 17 safe-in-human dose would be if you've already 18 tested in animals and you know the NOAEL, 19 then you could then calculate a human dose, 20 apply tenfold less. That's your tenfold 21 safety factor, and then apply that for 22 first-in-human studies. 23 That's how that safety factor 24 applies. That's not specific to the 25 allometric scaling, which is based on mixed</p>

<p style="text-align: right;">Page 294</p> <p>1 per meter square metabolism differences 2 between humans and animals. 3 Q. Right. 4 So you skipped the safety 5 factor part, right? 6 A. You don't -- you don't -- the 7 safety factor part is part of first-in-human 8 dosing. The allometric scaling is not only 9 used there, but it's also used in EPA 10 guidance in regards to power calculations for 11 converting for animal to human dosage. 12 It's used throughout the 13 literature. It's used throughout labels. If 14 you pull out any label, you'll see the type 15 of calculation that I did. 16 Q. Okay. So you just disagree 17 with the defense experts' criticism of the 18 way you calculated that? 19 A. I think they're 20 misinterpreting. 21 Q. Okay. Well, you just mentioned 22 EPA. So let's look at EPA guidance -- or not 23 EPA guidance. 24 AOP 20, which we were talking 25 about before, which your counsel now has a</p>	<p style="text-align: right;">Page 296</p> <p>1 groups including sulfhydryl groups of 2 proteins involved in the protection against 3 oxidative stress. 4 Q. Right. 5 And so it goes from the MIE to 6 the key event to the adverse outcome, right? 7 That's how you get an adverse outcome 8 pathway, fair? 9 A. Well, each one of the key 10 events is indicated by biological 11 organization, and -- but, yeah, you would -- 12 you would generally follow the key events 13 towards an adverse outcome. 14 Q. Right. 15 And the MIE is what you start 16 with, right? 17 A. In this example, they're 18 described here as molecular-initiating 19 events. 20 Q. All right. And then 21 molecular-initiating event here is the 22 binding of the thiols by methylmercury 23 chloride, mercury chloride and acrylamide, 24 right? 25 A. Those are three -- three</p>
<p style="text-align: right;">Page 295</p> <p>1 copy of, is marked as -- I believe it's 2 marked as Exhibit 1. 3 If you turn to -- 4 unfortunately, Doctor, these pages are not 5 numbered the way they appear. 6 So -- well, I have it, but I -- 7 if you're able to turn to Appendix 1. It's a 8 little after that. It's maybe 20 -- 9 A. There's pages at the top. 10 Q. Okay. 11 A. Maybe yours is stapled. Under 12 your staple. Under your binder. 13 Q. Oh, they're on that side. 14 26, Doctor. Okay. You see it 15 says Appendix 1, and it talks about the MIE 16 and KE and AO, right? 17 A. Yes. 18 Q. Okay. The MIEs are listed 19 first, right? 20 A. Yes, they are. 21 Q. And that is the binding of 22 essentially glutathione, right? 23 A. Well, this is sulfhydryl 24 groups, so it doesn't necessarily mean 25 glutathione per se, but it's sulfhydryl</p>	<p style="text-align: right;">Page 297</p> <p>1 examples of stressors that can initiate these 2 events. 3 Q. Right. 4 And it doesn't say 5 acetaminophen is one of the MIEs here to 6 initiate the event with the -- with binding 7 of thiol, right? 8 A. It's listed as a stressor later 9 in this study. 10 Q. Not for this MIE, correct? 11 A. It's not -- it's not under this 12 MIE. 13 Q. Okay. So if you -- if you now 14 turn to the page with the top 42. Now, this 15 is -- this is the next step in the cascade. 16 This is the key event, right? 17 A. It's oxidative stress. So it's 18 a key event in this pathway. 19 Q. Right. 20 First you have the MIE, right? 21 So the thiols were bound. Now, you have the 22 key event of oxidative stress, right? 23 A. This is a key event that occurs 24 in the pathway. 25 Q. Okay. Did I say anything wrong</p>

<p style="text-align: right;">Page 298</p> <p>1 in my question?</p> <p>2 A. I'm just clarifying.</p> <p>3 Q. Okay. And there's three</p> <p>4 stressors listed here. One is acetaminophen,</p> <p>5 one is chloroform, and one is furan, right?</p> <p>6 A. That's correct.</p> <p>7 Q. Okay. And do you know how</p> <p>8 chloroform works?</p> <p>9 A. In what capacity?</p> <p>10 Q. As a stressor.</p> <p>11 A. I haven't looked into it</p> <p>12 specifically.</p> <p>13 Q. Okay. Did you look at the</p> <p>14 references underlying this key event in the</p> <p>15 AOP?</p> <p>16 A. Yes, I did.</p> <p>17 Q. Okay. And do you remember what</p> <p>18 it showed?</p> <p>19 A. I'd have to look at them</p> <p>20 specifically.</p> <p>21 (Cabrera Exhibit 15 marked for</p> <p>22 identification.)</p> <p>23 QUESTIONS BY MR. MURDICA:</p> <p>24 Q. Let's take a look. This is</p> <p>25 Exhibit 15.</p>	<p style="text-align: right;">Page 300</p> <p>1 right, in -- on page 42 of the pathway?</p> <p>2 A. It is not.</p> <p>3 Q. But chloroform is?</p> <p>4 A. That's correct.</p> <p>5 Q. And in your report, you have</p> <p>6 lots of drawings of molecules,</p> <p>7 representations of them.</p> <p>8 Do you know the difference</p> <p>9 between chloroform and carbon tetrachloride?</p> <p>10 A. Not off the top of my head.</p> <p>11 Q. Do you know what chloroform</p> <p>12 looks like molecularly?</p> <p>13 A. I couldn't draw it for you</p> <p>14 right now if you asked.</p> <p>15 Q. Okay. Do you have a chemistry</p> <p>16 degree?</p> <p>17 A. I have a background in</p> <p>18 chemistry.</p> <p>19 Q. Okay. The things in your</p> <p>20 report that are drawings of molecules, did</p> <p>21 you copy those from somewhere?</p> <p>22 A. If I referenced them, then</p> <p>23 there would be reference for those studies.</p> <p>24 Q. If the pictorial representation</p> <p>25 is in the report, you didn't draw those,</p>
<p style="text-align: right;">Page 299</p> <p>1 Doctor, you now have in front</p> <p>2 of you Exhibit 15. This, I'll represent to</p> <p>3 you, and I can show you if you need to, is</p> <p>4 one of the references for this section of the</p> <p>5 AOP.</p> <p>6 And it's what's specifically</p> <p>7 referenced for acetaminophen, chloroform and</p> <p>8 furan as stressors, and you can see it's</p> <p>9 listed in the references.</p> <p>10 Have you seen this before?</p> <p>11 A. I believe I did see this</p> <p>12 reference when I was going through the AOP.</p> <p>13 Q. Okay. And do you consider</p> <p>14 ethanol an oxidative stressor?</p> <p>15 A. It can produce oxidative</p> <p>16 stress.</p> <p>17 Q. Okay. And when I asked you</p> <p>18 before about carbon tetrachloride as an</p> <p>19 oxidative stressor, do you remember your</p> <p>20 answer?</p> <p>21 A. You had asked me if it was in</p> <p>22 the pathway. I told you I wasn't sure I had</p> <p>23 seen that in the pathway previously.</p> <p>24 Q. I think you said yes, but</p> <p>25 regardless, it's not -- it's not listed here,</p>	<p style="text-align: right;">Page 301</p> <p>1 right?</p> <p>2 A. It's likely I'm referencing in</p> <p>3 the studies.</p> <p>4 Q. Okay. So if I asked you to</p> <p>5 draw a carbon tetrachloride right now, you</p> <p>6 couldn't?</p> <p>7 A. Carbon tetrachloride I could</p> <p>8 draw.</p> <p>9 Q. Okay.</p> <p>10 A. That's a simple compound.</p> <p>11 Q. Okay. But chloroform you</p> <p>12 couldn't?</p> <p>13 A. I might not get it right. If</p> <p>14 this is a -- I don't study chloroforms, so --</p> <p>15 Q. Okay.</p> <p>16 A. -- how different it is from</p> <p>17 carbon tetrachloride, I'm not sure.</p> <p>18 Q. It's very similar.</p> <p>19 A. Okay.</p> <p>20 Q. It's only one small difference.</p> <p>21 A. And that, I'm not sure about.</p> <p>22 Q. Okay. One of the -- one of the</p> <p>23 chlorines are replaced with hydrogen.</p> <p>24 A. Okay. I could draw that.</p> <p>25 Q. Yep. Okay.</p>

<p style="text-align: right;">Page 302</p> <p>1 So in any event, going back to</p> <p>2 Exhibit 15, if you turn to the second page</p> <p>3 which has 64 on the top -- sorry, we're back</p> <p>4 on this. Sorry.</p> <p>5 A. Oh, we're going back.</p> <p>6 Q. Did I give you the wrong one?</p> <p>7 It's Jackson. I believe it's 15.</p> <p>8 A. What -- which reference are we?</p> <p>9 Q. Jackson.</p> <p>10 A. What number?</p> <p>11 Q. 15, I believe.</p> <p>12 A. 15. Okay.</p> <p>13 Q. Flip the page.</p> <p>14 A. Yes.</p> <p>15 Q. It's the second page.</p> <p>16 I'm going to represent to you</p> <p>17 that this is -- the only mention of</p> <p>18 acetaminophen in any of the references is</p> <p>19 right here for why it's included as a</p> <p>20 stressor.</p> <p>21 Do you see in that paragraph it</p> <p>22 says low-molecular-weight ligands including</p> <p>23 ethanol, acetaminophen, carbon tetrachloride,</p> <p>24 chloroform, furan, increase CYP2E's --</p> <p>25 CYP2E1's half-life from 7 to 32 hours?</p>	<p style="text-align: right;">Page 304</p> <p>1 non-hepatocarcinogens.</p> <p>2 Q. All right. It's not about</p> <p>3 oxidative stress, right? It's about the</p> <p>4 half-life and the hepatocarcinogenicity?</p> <p>5 A. Well, to be clear, CYP2E1 is an</p> <p>6 oxidation pathway, so it is actually about</p> <p>7 oxidation, yes.</p> <p>8 Q. Right.</p> <p>9 But nowhere in here does it</p> <p>10 come to the conclusion that acetaminophen is</p> <p>11 an oxidative stressor in this article, right?</p> <p>12 A. Well, by simply saying it is</p> <p>13 oxidized by CYP2E1, it becomes an oxidative</p> <p>14 stressor. It's -- that's -- that pathway is</p> <p>15 called oxidation.</p> <p>16 Q. And you see in this -- in</p> <p>17 Figure 2 where it's CYP2E1 ligands, it's</p> <p>18 talking about six-hour half-life, right?</p> <p>19 That's how it's labeled, 300 milligrams</p> <p>20 per kilogram, six hours?</p> <p>21 A. In that example, there's a</p> <p>22 12-hour. There's 24-hour, and then there's</p> <p>23 also a six-hour, and my --</p> <p>24 Q. Oh, you're looking above?</p> <p>25 A. -- understanding is there's</p>
<p style="text-align: right;">Page 303</p> <p>1 A. I do see that statement, but it</p> <p>2 also specifically mentions acetaminophen,</p> <p>3 particularly in Figure 2, in regards to</p> <p>4 interactions.</p> <p>5 Q. All right. Well, I apologize</p> <p>6 if I missed that.</p> <p>7 Figure 2?</p> <p>8 A. Yes.</p> <p>9 It's listed as APAP multiple</p> <p>10 times.</p> <p>11 Q. Okay. You're looking at the</p> <p>12 first and third line?</p> <p>13 A. Multiple times. It's listed</p> <p>14 both under the CYP2E1 ligands based on</p> <p>15 clustering analysis, if we're looking at risk</p> <p>16 of cancer generation and inflammation.</p> <p>17 Q. Right.</p> <p>18 And this is listing the</p> <p>19 lengthening of the half-life, right? That's</p> <p>20 what this figure is about?</p> <p>21 A. This looks like it's comparing</p> <p>22 gene expression that results from these</p> <p>23 exposures that reflect liver cancer, liver</p> <p>24 regeneration or CYP2E1 ligand interactions</p> <p>25 and hepatocarcinogens and</p>	<p style="text-align: right;">Page 305</p> <p>1 clustering -- that's right.</p> <p>2 Q. You're looking above. Okay.</p> <p>3 Okay.</p> <p>4 So you think on the basis of</p> <p>5 the presence in that figure is why it's</p> <p>6 listed as a stressor in this adverse outcome</p> <p>7 pathway?</p> <p>8 A. The fact that it's metabolized</p> <p>9 by CYP2E1 and then consumes glutathione in</p> <p>10 the production of NAPQI is why it's listed</p> <p>11 there as being part of an oxidative stressor.</p> <p>12 Quite literally, that pathway of CYP2E1, it's</p> <p>13 an oxidation pathway.</p> <p>14 Q. But, Doctor, this doesn't say</p> <p>15 NAPQI anywhere in this article or in this</p> <p>16 chart, right? That's your -- that's what you</p> <p>17 were saying, separate and apart from this</p> <p>18 article, right?</p> <p>19 A. CYP2E1 is an oxidation pathway,</p> <p>20 so being metabolized by CYP2E1, the process</p> <p>21 is called oxidation. That's why it's part of</p> <p>22 this pathway.</p> <p>23 Q. Yes.</p> <p>24 And I just asked you if NAPQI</p> <p>25 is anywhere in this article.</p>

<p style="text-align: right;">Page 306</p> <p>1 A. That -- that's the product of</p> <p>2 the oxidation of acetaminophen is NAPQI.</p> <p>3 Q. And we'll talk about this</p> <p>4 later, but NAPQI is bound by glutathione if</p> <p>5 it's produced in the liver, correct?</p> <p>6 A. Not entirely, but that is the</p> <p>7 primary antioxidant that normally would</p> <p>8 absorb.</p> <p>9 Q. And in this -- in this --</p> <p>10 A. NAPQI.</p> <p>11 Q. In this AOP, the first event</p> <p>12 was binding the thiols, and then you're</p> <p>13 stressing it with acetaminophen or some other</p> <p>14 stressor as listed here, right? So the</p> <p>15 thiols are already gone?</p> <p>16 A. So the -- this stressor as</p> <p>17 listed is oxidation, and so acetaminophen can</p> <p>18 produce oxidation, and it produces oxidation</p> <p>19 through being oxidized by CYP2E1, so it</p> <p>20 itself becomes a stressor.</p> <p>21 Q. In this pathway, the stressor</p> <p>22 is applied after the first event, which was</p> <p>23 the heavy metal, correct?</p> <p>24 A. If you -- if you wanted to</p> <p>25 start with a mercury exposure, then</p>	<p style="text-align: right;">Page 308</p> <p>1 Otherwise it wouldn't be in the</p> <p>2 fetus.</p> <p>3 Q. In the cord blood?</p> <p>4 A. In the -- in the -- yeah, in</p> <p>5 the cord blood of the fetus.</p> <p>6 Q. Okay. Just because of its</p> <p>7 mere -- because of its presence, which could</p> <p>8 have appeared just before the time of</p> <p>9 sampling, that's your theory?</p> <p>10 A. It's not a theory. It's there.</p> <p>11 Q. Oh, Doctor, I know -- I believe</p> <p>12 that you believe all of the opinions that</p> <p>13 nobody else agrees with in the entire world.</p> <p>14 I believe you believe them. I'm just trying</p> <p>15 to get a record.</p> <p>16 MR. TRACEY: Objection.</p> <p>17 Argumentative.</p> <p>18 MR. MURDICA: There's not a</p> <p>19 pending question, Mr. Tracey.</p> <p>20 QUESTIONS BY MR. MURDICA:</p> <p>21 Q. Okay. So the ultimate part of</p> <p>22 this pathway is the outcome, and the outcome</p> <p>23 here is something you attribute to autism,</p> <p>24 right?</p> <p>25 A. It's not just a -- what I</p>
<p style="text-align: right;">Page 307</p> <p>1 acetaminophen could be a risk factor in</p> <p>2 regards to the outcome for heavy metal</p> <p>3 exposure.</p> <p>4 What I've done is shown that</p> <p>5 acetaminophen is also reducing the amount of</p> <p>6 glutathione, even at clinical levels in</p> <p>7 humans, and that that's an oxidative stressor</p> <p>8 consistent with the AOP 20.</p> <p>9 Q. And you've shown that not in</p> <p>10 your own work, right?</p> <p>11 A. I've shown that --</p> <p>12 Q. You mean in your report?</p> <p>13 A. -- in this report.</p> <p>14 Q. Okay. And you saw the -- every</p> <p>15 defense expert who works on this stuff</p> <p>16 disagrees with you because they say that</p> <p>17 there's plenty of glutathione to process the</p> <p>18 maximum recommended dose with a 90 percent</p> <p>19 margin of excess glutathione, right?</p> <p>20 A. Well, to be clear, we just</p> <p>21 looked at a study, if you recall, and they</p> <p>22 had N-acetyl cysteine APAP detected in the</p> <p>23 cord blood, and so clearly there's not enough</p> <p>24 glutathione to soak up all of the</p> <p>25 acetaminophen or the NAPQI.</p>	<p style="text-align: right;">Page 309</p> <p>1 attribute. It's consistent with the OECD</p> <p>2 guidelines as I indicated in my report.</p> <p>3 Q. Okay. So the outcome of this</p> <p>4 pathway is, in part, autism according to</p> <p>5 Dr. Cabrera, correct?</p> <p>6 A. The -- no. As the pathway</p> <p>7 reads, it's an impairment of learning and</p> <p>8 memory in the AOP, but the AOP also offers</p> <p>9 guidance in what that means.</p> <p>10 And that guidance, which I'll</p> <p>11 be happy to read into the record, has also</p> <p>12 been linked to neurodevelopmental diseases</p> <p>13 and deficits like autism spectrum disorder</p> <p>14 and postnatal motor coordination deficits.</p> <p>15 Q. Okay. So you would link it to</p> <p>16 autism through this AOP, correct, and you do</p> <p>17 in your report; is that fair?</p> <p>18 A. So those are based on the OECD</p> <p>19 guidelines.</p> <p>20 Q. Do you agree, yes or no? You</p> <p>21 would link this -- you would link this AOP to</p> <p>22 autism, and you do in your report, correct?</p> <p>23 A. Consistent with the OECD</p> <p>24 guidelines, I would say that impairments in</p> <p>25 learning and in memory in children and animal</p>

Page 310

1 models and regarding the oxidative stress
 2 that caused neurodevelopment disorders, the
 3 AOP indicates oxidative stress, and I'll
 4 quote, "Has also been linked to
 5 neurodevelopmental diseases and deficits like
 6 autism spectrum disorder and postnatal
 7 coordination motor deficits."
 8 Q. And you rely on this AOP for
 9 your causation opinion on autism, right?
 10 A. So I apply that AOP to see if
 11 there's any gaps in the mechanism for
 12 understanding whether there's a biological
 13 plausibility.
 14 Q. Right.
 15 And the outcome here is
 16 learning disability, right?
 17 A. Impairment of learning and
 18 memory.
 19 Q. Impairment of learning and
 20 memory.
 21 And you use this outcome and
 22 extrapolate it to autism and ADHD, correct?
 23 A. So to be clear, it's not just
 24 my extrapolation. It's consistent with OECD
 25 guidelines on what have also been linked

Page 311

1 with these -- with these outcomes.
 2 Q. I understand that.
 3 But you also -- you you can
 4 read what you read, but you also --
 5 Dr. Cabrera extrapolates it to autism as well
 6 in your report, right?
 7 A. I -- the testing that is used,
 8 some of those also measure the same
 9 developmental neurotoxicity guideline testing
 10 that are also -- that are also included in
 11 autism core behaviors and in animals as well.
 12 Q. Right.
 13 So you took all of that, and
 14 you extrapolated this AOP to autism for your
 15 causation opinion, right?
 16 A. I used it to see if there
 17 was -- to identify whether there was deficits
 18 in the mechanistic cascade as part of
 19 biological plausibility for my causality
 20 analysis.
 21 Q. And you found this compelling
 22 for your causality analysis for autism,
 23 correct?
 24 A. I found that there weren't gaps
 25 in the data in regards to a biological

Page 312

1 plausibility.
 2 Q. Okay. Are you -- is there some
 3 reason you can't give a direct answer to my
 4 question? Do you find this compelling for
 5 autism as an outcome in this pathway or not?
 6 A. As indicated, these -- and I'm
 7 happy to, you know, speak specifically to
 8 that. The testing in the animals, they
 9 produce core behaviors that are consistent
 10 with what we refer to as autism core
 11 behaviors in the animal. So that's part of
 12 the animal impacts.
 13 Those parallel to human. And
 14 so there is a parallel there. I'm not
 15 extrapolating. It's just a parallel.
 16 Q. Okay. And that parallel is why
 17 you used AOP 20 for your causation opinion as
 18 to autism, right, among other things?
 19 A. Among other things.
 20 MR. MURDICA: Okay. Let's mark
 21 this as 16.
 22 (Cabrera Exhibit 16 marked for
 23 identification.)
 24 QUESTIONS BY MR. MURDICA:
 25 Q. Doctor, did you know that this

Page 313

1 was -- that AOP 20 was rejected with respect
 2 to autism before its publication?
 3 A. I have not seen this --
 4 Q. Okay. So --
 5 A. -- internal review.
 6 Q. So this is new to you; that
 7 they specifically rejected connecting it to
 8 autism?
 9 A. I haven't seen this document
 10 that you've just given me.
 11 Q. Okay. Do you want to take some
 12 time to look at it? Because I'll represent
 13 to you that AOP 20 originally had an outcome
 14 of autism, and it was rejected for lack of
 15 validity.
 16 MS. KING: Do you have a copy?
 17 MR. MURDICA: I don't. I only
 18 have my copy.
 19 THE WITNESS: Do you want to go
 20 off the record? We can make copies
 21 and --
 22 MR. TRACEY: Yeah, make a copy
 23 of it and read it, Robert. And
 24 somebody send me a copy.
 25 MS. JOHNSTON: No problem.

<p>Page 314</p> <p>1 Let's go off the record and handle 2 that.</p> <p>3 VIDEOGRAPHER: Off the record, 4 3:40. 5 (Off the record at 3:40 p.m.)</p> <p>6 VIDEOGRAPHER: The time is 7 3:56 p.m., back on the record. 8 Beginning of Media 6.</p> <p>9 QUESTIONS BY MR. MURDICA:</p> <p>10 Q. Dr. Cabrera, are you ready to 11 proceed?</p> <p>12 A. Yes, I am.</p> <p>13 Q. Okay. Welcome back. 14 Dr. Cabrera, what's in front of 15 you is marked Exhibit 16, and before we get 16 into it, I have some questions for you. 17 You -- we've talked a lot about AOPs today. 18 Have you ever been part of an 19 AOP review?</p> <p>20 A. I have not.</p> <p>21 Q. Okay. Have you ever submitted 22 an AOP yourself for review?</p> <p>23 A. I have not.</p> <p>24 Q. Okay. Is the -- are you 25 familiar with the review process that AOPs go</p>	<p>Page 316</p> <p>1 Do you know if that's someone 2 in the Canadian government?</p> <p>3 A. It looks like they might be, 4 that canada.ca, or is that -- yes.</p> <p>5 Q. It may -- it may be 6 governmental, right, Doctor?</p> <p>7 A. Maybe.</p> <p>8 Q. Okay. And the secondary 9 reviewer, number 1, is someone who appears to 10 be from some regulatory body in the 11 Netherlands potentially?</p> <p>12 A. I'm not sure what rivm is 13 related to.</p> <p>14 Q. Okay. But the third reviewer, 15 the secondary reviewer, number 2, you know 16 where that person is from, right?</p> <p>17 A. Yes.</p> <p>18 Q. And where is that?</p> <p>19 A. Their domain is epa.gov.</p> <p>20 Q. Okay. And I take it you've had 21 a chance to review this document now --</p> <p>22 A. Yes, I have.</p> <p>23 Q. -- on the break?</p> <p>24 Okay. And you understand it to 25 be the review of AOP 20, correct?</p>
<p>Page 315</p> <p>1 through?</p> <p>2 A. Yes, I am.</p> <p>3 Q. Okay. Is it from reading this 4 document, or did you know beforehand?</p> <p>5 A. I actually -- there was a 6 presentation on it this year at Birth Defects 7 Research Prevention, and I had lunch with the 8 person that had just submitted an AOP, so we 9 talked about it extensively.</p> <p>10 Q. So in other words, you were at 11 a conference and somebody -- another attendee 12 explained to you the process because they 13 were going through it?</p> <p>14 A. Well, I was already familiar 15 with it, but then he also gave me a firsthand 16 account.</p> <p>17 Q. Okay. And you see on the first 18 page of Exhibit 16, there are reviewers, 19 right?</p> <p>20 A. Yes.</p> <p>21 Q. And there's a primary reviewer 22 and two secondary reviewers, correct?</p> <p>23 A. That's what I see, yes.</p> <p>24 Q. Okay. And the first one has an 25 e-mail extension of @canada.ca.</p>	<p>Page 317</p> <p>1 A. I do.</p> <p>2 Q. And this was a prepublication 3 review, right?</p> <p>4 A. Yes.</p> <p>5 Q. Okay. And one of the things we 6 see is that AOP 20 had been copied from 7 another AOP, correct? Based on your review, 8 does that -- what it appears to have been?</p> <p>9 A. It sounds like it was modified 10 from an existing one.</p> <p>11 Q. Right.</p> <p>12 It was essentially copied, 13 pasted and then modified, right, with a 14 different MIE?</p> <p>15 A. Potentially. I didn't get the 16 specifics of that in my reading, but it 17 sounded like at least part of it was used in 18 this AOP.</p> <p>19 Q. And one of the -- and you 20 correct me where I'm wrong here, but I'm just 21 trying to make it easier so we can get 22 through it.</p> <p>23 One of the main points of 24 feedback from all reviewers is that the 25 outcome in this pathway that's explained</p>

<p style="text-align: right;">Page 318</p> <p>1 should not be autism, correct?</p> <p>2 A. I think the, you know -- my</p> <p>3 reading, we can do particular quotes if you</p> <p>4 want, but my reading of it is that if it's</p> <p>5 going to be autism, they need to state that</p> <p>6 it's autism. If it's going to be as</p> <p>7 endpoints in impairment to learning and</p> <p>8 memory, then they need to make it impairment</p> <p>9 to learning and memory, to pick one.</p> <p>10 Q. And they need to have the data</p> <p>11 to back it up if they're going to keep autism</p> <p>12 in, correct?</p> <p>13 A. Yeah, there was some</p> <p>14 conversation in regards to what it would</p> <p>15 mean -- what changes would be required if it</p> <p>16 was autism as opposed to learning and memory.</p> <p>17 Q. And, in fact, the author's</p> <p>18 response was, quote, "We can totally remove</p> <p>19 the autism aspect and consider only learning</p> <p>20 and memory impairment, for which there is</p> <p>21 enough experimental support."</p> <p>22 Correct? Do you see that?</p> <p>23 A. If you're doing a quote, I'm</p> <p>24 not sure what page you're on.</p> <p>25 Q. I wish I could tell you.</p>	<p style="text-align: right;">Page 320</p> <p>1 know.</p> <p>2 MR. MURDICA: Okay. You're</p> <p>3 defending the deposition in person?</p> <p>4 MS. KING: Yes.</p> <p>5 MR. MURDICA: Okay. Is Sean</p> <p>6 okay?</p> <p>7 MS. KING: It's okay. It's</p> <p>8 okay. I'm sorry to interrupt. I just</p> <p>9 wanted to -- everybody to know if I</p> <p>10 start talking, that's why.</p> <p>11 MR. MURDICA: Okay. All right.</p> <p>12 We can take a break at any time if</p> <p>13 necessary, and we're all fine with</p> <p>14 that.</p> <p>15 MS. KING: It's okay. I'm</p> <p>16 good.</p> <p>17 QUESTIONS BY MR. MURDICA:</p> <p>18 Q. Okay. I believe you would put</p> <p>19 them all in the categories of biologic</p> <p>20 plausibility, but you proposed several</p> <p>21 mechanisms, I would say, by which</p> <p>22 acetaminophen could affect neurologic</p> <p>23 outcomes in your report, right?</p> <p>24 Let me give you some examples.</p> <p>25 You proposed that</p>
<p style="text-align: right;">Page 319</p> <p>1 They're not numbered. I can show you my</p> <p>2 copy. It's right there.</p> <p>3 So my question is, the author</p> <p>4 of AOP 20 in response to the feedback on</p> <p>5 removing autism from the three reviewers</p> <p>6 said, quote, "We can totally remove the</p> <p>7 autism aspect and consider only learning and</p> <p>8 impairment for which there is enough</p> <p>9 experimental support."</p> <p>10 Did I read that correctly?</p> <p>11 A. That is a correct reading.</p> <p>12 Q. Okay. Did you know before we</p> <p>13 sat here today that AOP 20 didn't have enough</p> <p>14 experimental support to include autism as an</p> <p>15 outcome?</p> <p>16 A. I hadn't seen this study prior</p> <p>17 to you showing this internal review. I</p> <p>18 hadn't seen this internal review.</p> <p>19 Q. Okay. All right. We can put</p> <p>20 that aside.</p> <p>21 In your report, you have</p> <p>22 numerous potential proposed pathways?</p> <p>23 MS. KING: I'm sorry, I just</p> <p>24 got that text. So I'm taking over</p> <p>25 now, if that's okay. Just letting you</p>	<p style="text-align: right;">Page 321</p> <p>1 acetaminophen, as we just talked about with</p> <p>2 the AOP, could cause oxidative stress via</p> <p>3 depletion of glutathione and generation of</p> <p>4 excess NAPQI that the glutathione can't</p> <p>5 process, right?</p> <p>6 A. I've seen in studies that</p> <p>7 acetaminophen can lower glutathione levels</p> <p>8 and cause oxidative stress.</p> <p>9 Q. Right.</p> <p>10 And then your theory goes that</p> <p>11 the oxidative stress can happen not just in</p> <p>12 the liver, it can happen in the fetal brain,</p> <p>13 and that stress -- right -- am I with you so</p> <p>14 far?</p> <p>15 A. I'm following you.</p> <p>16 Q. Yep. And you say that, right?</p> <p>17 The oxidative stress can happen in the fetal</p> <p>18 brain, right?</p> <p>19 A. Yes.</p> <p>20 Q. Okay. And then the outcome of</p> <p>21 that from oxidative stress in the fetal brain</p> <p>22 is some sort of neurological damage, right?</p> <p>23 A. Well, it influences the</p> <p>24 behavior of cells by changing the oxidation</p> <p>25 in the -- in the cells.</p>

Page 322

1 Q. Right.

2 And the effect on the cells in

3 your theory would be the exact right way to

4 induce ADHD or autism, right?

5 A. You --

6 (Discussion held off the

7 record.)

8 QUESTIONS BY MR. MURDICA:

9 Q. I can do that again, if you'd

10 like.

11 A. Please.

12 Q. Okay. That the proposed

13 oxidative stress in the fetal brain can cause

14 some sort of neurologic damage that's the

15 exact type of cellular damage necessary to

16 create the presentation of ADHD or autism,

17 correct?

18 A. So there's a lot there in that

19 interaction inasmuch as changing the redox --

20 the redox potential of cells changes their

21 behavior. So it can influence the behavior

22 of cells during the developing nervous

23 system, and that can produce adverse outcomes

24 specific with increased risk of autism --

25 autistic core behaviors.

Page 323

1 Q. Right.

2 And in the section of your

3 report that discusses that mechanism, most of

4 the endpoints are just neurologic toxicity,

5 not autism and ADHD themselves, correct?

6 A. Well, it works through there

7 sequentially. So at a molecular level, you

8 don't see autism or autistic core behaviors

9 neither at a cellular or a tissue level, per

10 se. You would only see those at an organism

11 level.

12 Q. Right.

13 But the pathway that I just

14 described is your -- it's your oxidative

15 stress proposed pathway to get from ingestion

16 of acetaminophen to autism in a human baby,

17 right?

18 A. That is one application, yes.

19 Q. Right.

20 Now, you included, I think,

21 five or six other potential pathways in your

22 report as well, right?

23 A. I reference interactions,

24 things that happen in parallel with that.

25 Q. Yeah. Antagonism of the

Page 324

1 endocannabinoid pathway, right? That's one?

2 A. I did mention, yes,

3 endocannabinoids.

4 Q. Okay. You gave me a paper

5 today that talks about notch signalling and

6 SOX2, right?

7 A. That's correct.

8 Q. Are you adding that as a

9 proposed mechanism?

10 A. Not currently, other than the

11 fact that they did acetaminophen exposure and

12 they're looking at particular changes in that

13 signalling pathway. So that's a proposed

14 signalling pathway for impacts on the

15 hippocampus, but I'm not -- I haven't started

16 drafting anything about that as a pathway.

17 Q. Right.

18 And I'm just asking you today,

19 regardless of whether you started drafting

20 something, are you -- are you going to

21 propose that as a biologically plausible

22 pathway based on the -- on the Xie article

23 that you handed me today?

24 A. In and of itself, there is some

25 other hippocampal data and impacts, but I --

Page 325

1 that's not something I currently plan to do.

2 Q. Okay. Ultimately, when you

3 came to your causation conclusion in this

4 case, which pathway -- because you proposed

5 many others, which pathway did you pick?

6 A. So the two that I found

7 evidence for when applying the AOP model was

8 the oxidative stress and the endocannabinoid

9 pathways.

10 Q. Okay. And the rest of them you

11 included as background, essentially?

12 A. Well, just in regards to there

13 are other things that happen -- biological

14 systems that can interact with those

15 pathways, but those are the core pathways.

16 Q. Right.

17 The other ones outside of the

18 endocannabinoid and the oxidative stress you

19 agree are not -- they either don't make it

20 all the way along the pathway or they're not

21 specific to autism or ADHD, correct?

22 A. So specifically applying the

23 AOP, there would be gaps in the data that

24 would leave a gap in the biological

25 plausibility that would need additional data

Page 326

1 to fill in those gaps.

2 Q. So Dr. Cabrera, for his

3 causation opinion, is going on oxidative

4 stress and endocannabinoid antagonism, right,

5 as pathways?

6 A. Well, I don't know about

7 antagonism inasmuch as increasing agonist

8 signal through an anandamide would also be --

9 would also be an interaction. So not

10 strictly just antagonism because there's also

11 some agonism going on there.

12 Q. But that's still an -- the

13 endocannabinoid pathway?

14 A. It's still the endocannabinoid

15 pathway.

16 Q. Okay. And now that you've seen

17 that AOP 20 was not intended to be used for

18 the outcome of autism, are you going to stand

19 by your opinions here?

20 A. So I use the same methodology

21 as described in -- as I had already

22 mentioned, the same methodology that was

23 described in AOP, to come to the similar

24 adverse events, which include impairment of

25 learning and memory, which overlap with core

Page 327

1 autism behaviors.

2 Q. Right.

3 Some autistic patients have

4 impairment of learning as a symptom. Some,

5 but not all, correct?

6 A. That is correct.

7 Q. Okay. So you're going to rely

8 on a pathway that leads to a symptom for some

9 autistic patients to apply to ADHD and autism

10 for all patients, correct?

11 A. Not for all patients. It would

12 have to be -- I mean, if we're talking about

13 case-specific, you have to consider both

14 genetic and environment interactions. This

15 is simply looking at the biological

16 plausibility of those interactions.

17 Q. Right.

18 So according to Dr. Cabrera on

19 the AOP 20 pathway, it's biologically

20 plausible to get to impaired learning,

21 correct?

22 A. So using the AOP 20 as a

23 framework, we can move from -- and I can walk

24 through that.

25 Acetaminophen can reduce

Page 328

1 glutathione and that can increase risk for

2 oxidative stress. It's been shown in humans,

3 even in regards to modeling in pregnant

4 mothers. There's NAPQI there.

5 And you can look at that

6 effect. In particular, if you want to look

7 at embryos or fetuses, you have to look at

8 animal models. But we've seen that there's

9 changes in glutathione in the animal models,

10 the presence of acetaminophen in those animal

11 models, and we've seen the adverse events

12 that are produced in those animal models.

13 And those parallel what we see in the

14 literature in regards to epidemiological

15 studies.

16 So that's a totality of data

17 there when we -- when we apply this model to

18 those experiments.

19 Q. Right.

20 And the impaired learning that

21 you get to from AOP 20, because it's a

22 symptom of one of your two outcomes, because

23 it's a symptom of autism, you're

24 extrapolating it to the -- to the entire

25 autism population as a possible causal factor

Page 329

1 and to ADHD, correct?

2 A. Well, it's not just impairment

3 in learning because we also see some other

4 autistic core behaviors in the animals that

5 are exposed to acetaminophen.

6 Q. Okay. And your theory, without

7 human evidence for legal and ethical reasons,

8 is that acetaminophen can make it across the

9 fetal blood-brain barrier in enough quantity

10 to deplete all the glutathione in the fetal

11 brain and generate enough NAPQI in the fetal

12 brain to cause oxidative stress and cause

13 neurologic changes during development,

14 correct?

15 A. It doesn't need to be a

16 complete depletion of glutathione. So that's

17 not correct.

18 Q. Okay. Anything else about what

19 I just said wrong? Is there anything else

20 wrong with what I just said?

21 A. Well, just to clarify, it

22 doesn't need to be a complete depletion of

23 glutathione.

24 Q. Is glutathione not -- in the

25 opinion of Dr. Cabrera, not effective at

<p style="text-align: right;">Page 330</p> <p>1 finding NAPQI?</p> <p>2 A. It is, but it doesn't need to</p> <p>3 be a complete depletion in order to change</p> <p>4 the cell behavior of stem cells or neuro stem</p> <p>5 cells.</p> <p>6 Q. Is it your testimony that NAPQI</p> <p>7 that's bound with glutathione -- to</p> <p>8 glutathione can still change stem cells?</p> <p>9 A. Changing the reduction</p> <p>10 potential in a stem cell population will</p> <p>11 change the behavior of the cells as indicated</p> <p>12 in my report.</p> <p>13 Q. Okay. Even if -- does that</p> <p>14 apply, according to Dr. Cabrera, even if only</p> <p>15 10 percent of the glutathione is needed to</p> <p>16 bind all of the present NAPQI?</p> <p>17 A. As has been shown, the --</p> <p>18 that's not a true statement because there's</p> <p>19 already N-acetyl cysteine bound to</p> <p>20 glutathione found in the cord blood. So it's</p> <p>21 not enough in order to bind all of it.</p> <p>22 So some of it is getting to the</p> <p>23 fetus, and some of it is being metabolized by</p> <p>24 glutathione in the fetal compartment.</p> <p>25 Q. So now you're relying today,</p>	<p style="text-align: right;">Page 332</p> <p>1 now have in front of you what's been marked</p> <p>2 as Exhibit 17.</p> <p>3 Do you have that?</p> <p>4 A. Yes, I do.</p> <p>5 Q. All right. And these are</p> <p>6 documents that you reviewed before, right?</p> <p>7 A. I've seen them.</p> <p>8 Q. They're on -- they're in your</p> <p>9 reliance materials?</p> <p>10 A. I believe they are, yes.</p> <p>11 Q. Okay. And they're -- you can</p> <p>12 tell from the appearance of the first page,</p> <p>13 can you not, that these are documents</p> <p>14 authored by the United States Food and Drug</p> <p>15 Administration?</p> <p>16 A. Yes.</p> <p>17 Q. Okay. Doctor, you have never</p> <p>18 been asked by FDA to weigh in on a drug</p> <p>19 label, have you?</p> <p>20 A. I'm not a labeling expert.</p> <p>21 Q. Okay.</p> <p>22 A. I've not been asked.</p> <p>23 Q. Okay. In your report and at</p> <p>24 your deposition today, you've offered</p> <p>25 opinions about what warnings or what labeling</p>
<p style="text-align: right;">Page 331</p> <p>1 Dr. Cabrera, on the 118 patients in the 2020</p> <p>2 Ji study that had acetyl cysteine metabolite</p> <p>3 in their cord blood to substantiate your</p> <p>4 theory?</p> <p>5 A. That also supports the</p> <p>6 biological plausibility and the causality.</p> <p>7 It's in totality. You can look at the</p> <p>8 breadth and the depth of the data, and it</p> <p>9 supports this interaction and this causality.</p> <p>10 Q. I believe that you believe</p> <p>11 that, Dr. Cabrera. I do. I can tell you're</p> <p>12 earnest.</p> <p>13 All right. Let's take a look</p> <p>14 at -- one of the things I think you said you</p> <p>15 looked at, Dr. Cabrera, is the documents</p> <p>16 produced about FDA's own analysis of this,</p> <p>17 right?</p> <p>18 A. Yes.</p> <p>19 Q. I take it you didn't bring it</p> <p>20 with you?</p> <p>21 A. I did not.</p> <p>22 (Cabrera Exhibit 17 marked for</p> <p>23 identification.)</p> <p>24 QUESTIONS BY MR. MURDICA:</p> <p>25 Q. Okay. Dr. Cabrera, you should</p>	<p style="text-align: right;">Page 333</p> <p>1 is present on acetaminophen.</p> <p>2 Do you remember saying that?</p> <p>3 A. I don't know about</p> <p>4 specifically, but we did have a conversation</p> <p>5 about that.</p> <p>6 Q. Let me -- let me -- let me ask</p> <p>7 you a question.</p> <p>8 Are you intending to offer an</p> <p>9 opinion on what the acetaminophen packaging</p> <p>10 or labeling should say?</p> <p>11 A. I'm not.</p> <p>12 Q. Okay. So the section in your</p> <p>13 report criticizing the labeling, should that</p> <p>14 even be in there?</p> <p>15 A. I didn't -- I didn't know that</p> <p>16 I had a specific criticism of the label. I</p> <p>17 would need to see the specific reference</p> <p>18 you're referring to.</p> <p>19 Q. Okay. In any event, is it</p> <p>20 accurate that you're not here today to offer</p> <p>21 any opinion, expert or otherwise, as to what</p> <p>22 the label should or should not say with</p> <p>23 respect to pregnancy with respect to</p> <p>24 acetaminophen?</p> <p>25 A. I mean, I have an opinion on</p>

<p style="text-align: right;">Page 334</p> <p>1 it, but I'm not a labeling expert, so I</p> <p>2 wouldn't be offering my expert opinion on</p> <p>3 that.</p> <p>4 Q. Okay. And you do know, though,</p> <p>5 what the FDA to date has said about whether</p> <p>6 or not the label should say anything about</p> <p>7 the risk of autism or ASD or any neurologic</p> <p>8 defect during pregnancy with the use of</p> <p>9 acetaminophen, right?</p> <p>10 A. I'm aware that they're planning</p> <p>11 on continuing studying this matter and that</p> <p>12 it's still open for debate.</p> <p>13 Q. And that they have been looking</p> <p>14 at it for -- since at least 2014, right?</p> <p>15 A. At least since 2015, in their</p> <p>16 report, so I assume it started somewhere</p> <p>17 before then.</p> <p>18 Q. Uh-huh.</p> <p>19 And even though they're looking</p> <p>20 at it, they've had opportunities for -- you</p> <p>21 know, since that period of time to come out</p> <p>22 and say that the label should be changed, and</p> <p>23 that has never happened.</p> <p>24 They've stuck by the advice</p> <p>25 that women should contact their physicians</p>	<p style="text-align: right;">Page 336</p> <p>1 QUESTIONS BY MR. MURDICA:</p> <p>2 Q. Right.</p> <p>3 And you don't know one way or</p> <p>4 the other because you don't know what every</p> <p>5 physician in the country knows or believes or</p> <p>6 thinks, right?</p> <p>7 A. I do not know what every</p> <p>8 physician in the country knows or believes or</p> <p>9 thinks.</p> <p>10 Q. And even though you don't</p> <p>11 prescribe medicine, it's a risk-benefit</p> <p>12 analysis no matter what, right?</p> <p>13 A. I'm familiar with risk-benefit</p> <p>14 analysis and, yes, that would apply here.</p> <p>15 Q. You know there are women with</p> <p>16 epilepsy who stay on antiepileptic</p> <p>17 medications during pregnancy, despite known</p> <p>18 risk of birth defects with the medication</p> <p>19 they may be taking, right?</p> <p>20 A. I'm aware of that.</p> <p>21 Q. And you don't doubt that that's</p> <p>22 a better gamble than the woman and the child</p> <p>23 dying if, for example, in a motor vehicle</p> <p>24 accident due to an epileptic seizure, right?</p> <p>25 MS. KING: Objection to form.</p>
<p style="text-align: right;">Page 335</p> <p>1 before taking any medication, right?</p> <p>2 MS. KING: Objection. Form.</p> <p>3 THE WITNESS: I think that's</p> <p>4 good advice. That being said,</p> <p>5 unfortunately, even in the absence of</p> <p>6 evidence, it has been widely assumed</p> <p>7 to be safe during pregnancy.</p> <p>8 QUESTIONS BY MR. MURDICA:</p> <p>9 Q. Right.</p> <p>10 And it's up to the physician to</p> <p>11 advise if a patient follows the current</p> <p>12 labeling and calls a physician, it's up to</p> <p>13 the physician to offer his or her</p> <p>14 recommendation on whether, for that</p> <p>15 particular patient in that particular</p> <p>16 circumstance, acetaminophen is an appropriate</p> <p>17 treatment, correct?</p> <p>18 MS. KING: Objection. Form.</p> <p>19 THE WITNESS: If it says to</p> <p>20 contact your physician during</p> <p>21 pregnancy, and the physician could</p> <p>22 make that opinion, but I guess the</p> <p>23 concern is whether they're fully</p> <p>24 informed on making that opinion.</p> <p>25</p>	<p style="text-align: right;">Page 337</p> <p>1 THE WITNESS: To be clear,</p> <p>2 the -- I -- I've spoken about this</p> <p>3 with treating physicians, and they've</p> <p>4 indicated they would normally switch</p> <p>5 to medications that have not been --</p> <p>6 such as away from valproic acid, to</p> <p>7 switch to medications that have not</p> <p>8 been associated with adverse outcomes.</p> <p>9 And then try to stabilize the</p> <p>10 epilepsy prior to pregnancy would be</p> <p>11 the preferable route.</p> <p>12 QUESTIONS BY MR. MURDICA:</p> <p>13 Q. Yeah. If they can, but that's</p> <p>14 not always a possibility. You know that,</p> <p>15 right?</p> <p>16 A. I'm aware of that.</p> <p>17 Q. Okay. Back to Exhibit 17, if</p> <p>18 you turn to Bates label 158. So you've never</p> <p>19 looked at FDA's internal regulatory documents</p> <p>20 before, I take it, unless it was in the</p> <p>21 context of litigation?</p> <p>22 A. In the context of litigation, I</p> <p>23 have.</p> <p>24 Q. Okay. And I know you're not</p> <p>25 going to offer a labeling opinion, but did</p>

Page 338

1 you see in your review that revising a label
 2 was something FDA put a red X on when they
 3 reviewed the data that we're going to -- the
 4 pregnancy data we're going to review here?
 5 Had you seen this before today?
 6 MS. KING: Objection. Form.
 7 THE WITNESS: So my read of
 8 this document was there was some
 9 questions raised in regards to
 10 reviewing the label, but I do see the
 11 red X that you've indicated on the
 12 page.
 13 MR. WATTS: What's the exhibit
 14 number?
 15 MR. MURDICA: It's 17.
 16 QUESTIONS BY MR. MURDICA:
 17 Q. Okay. Do you recall reading --
 18 you know FDA did their own epidemiologic
 19 analysis with their own science -- scientists
 20 at various points in '14, '15, '18, '20 and
 21 '22, right?
 22 MS. KING: Objection. Form.
 23 THE WITNESS: I -- I'm aware
 24 that they've had ongoing analysis. I
 25 have to look specifically in regards

Page 339

1 to the years that you've mentioned.
 2 QUESTIONS BY MR. MURDICA:
 3 Q. Okay. Without reference to the
 4 years, did you see that they review many of
 5 the human studies that you reviewed in your
 6 report?
 7 A. They've reviewed some of them,
 8 not all of them.
 9 Q. Okay. Yeah, I said many.
 10 So it depends on when you look,
 11 right? The most recent review that we have,
 12 I believe, is in 2022, so it would be missing
 13 whatever came out in the rest of '22 and '23.
 14 Is that what you're referring
 15 to?
 16 A. In part, yes.
 17 Q. Okay. Did you compare your
 18 review of the studies to FDA's review of the
 19 studies before you finalized your report?
 20 A. I was already familiar with the
 21 FDA's review of the studies, the past.
 22 Q. Okay. You know FDA review --
 23 reviewed animal studies about in utero
 24 acetaminophen exposure, right?
 25 A. I did see some of that as well,

Page 340

1 yes.
 2 Q. And did you see -- and that's
 3 called nonclinical review, right?
 4 A. Well, we generally refer to it
 5 as preclinical.
 6 Q. Preclinical?
 7 In their pre -- their
 8 preclinical reviewers came to a conclusion
 9 that additional animal data was not likely to
 10 be informative.
 11 Did you see that?
 12 MS. KING: Objection. Form.
 13 THE WITNESS: I read some
 14 correspondence where the findings were
 15 of concern, but in regards to
 16 conclusions, there was, to me, some
 17 mixed signals. In the epidemiology,
 18 they needed some more mechanism data
 19 which can be found in the animal
 20 models.
 21 And in the animal models, they
 22 wanted more specific information on
 23 outcomes, which is found in the human
 24 studies. So you really need to look
 25 at those together.

Page 341

1 QUESTIONS BY MR. MURDICA:
 2 Q. Dr. Cabrera, the preclinical
 3 reviewers, what they were really saying is
 4 that the outcomes in animal models aren't
 5 close enough, predictive enough to ASD and
 6 ADHD in humans for further studies to
 7 elucidate the issue, right?
 8 MS. KING: Objection. Form.
 9 QUESTIONS BY MR. MURDICA:
 10 Q. Whether you agree with it or
 11 not, that's what they -- you know that's what
 12 they said, right?
 13 MS. KING: Objection. Form.
 14 THE WITNESS: Well, if you want
 15 to find a particular quote, we can --
 16 we can look at that, but...
 17 QUESTIONS BY MR. MURDICA:
 18 Q. Okay. I'm just asking -- let
 19 me ask it this way.
 20 Do you remember them -- do you
 21 remember that being their rationale for
 22 saying that additional animal studies are not
 23 likely to be informative?
 24 A. For their rationale behind
 25 that?

Page 342

1 Q. Yeah.

2 A. The applicability, as I

3 mentioned, because these are animal models,

4 whether that was informative on a human

5 outcome.

6 Q. Right.

7 Because animal outcomes like we

8 were talking about earlier, where you're

9 looking at marbles and socialization and

10 everything, the FDA reviewer didn't see those

11 as being relevant enough to human symptoms in

12 autism and ADHD, correct?

13 MS. KING: Objection. Form.

14 THE WITNESS: I can't say. You

15 know, I can't read the person's mind,

16 per se, but the -- my takeaway from

17 this information was that there were

18 some reservations in regards to the

19 utility of the animal data for

20 application in the clinical outcomes.

21 The clinical outcomes claim the

22 same deficiency, that they needed more

23 mechanistic data, which is provided

24 with the animal studies, which really

25 you have to look at that data in total

Page 343

1 to understand what's going on.

2 QUESTIONS BY MR. MURDICA:

3 Q. And, Dr. Cabrera, that -- as

4 somebody who works on animals every day, that

5 must have jumped out to you, that they didn't

6 think any additional animal data would be --

7 would provide more information, right?

8 A. It's -- it's not the first time

9 I've heard something like that.

10 Q. I take it you disagree since

11 you work on animals.

12 Is that fair?

13 A. That's a -- I think that's

14 partially correct inasmuch as we do develop

15 animal models of human disease. We do

16 appreciate, as I've already mentioned,

17 there's differences in species, and that

18 those are models of human disease.

19 And I think that inasmuch as we

20 can do experiments on them that we couldn't

21 do on humans, they serve their purpose in

22 that regard.

23 Q. All right. If it -- I take

24 it -- I may have asked you this before. You

25 haven't attempted to tell FDA that you think

Page 344

1 you've got the animal model better than they

2 do, right?

3 A. I haven't done my own

4 acetaminophen studies in my laboratory.

5 Q. Okay. So you just review the

6 existing studies differently than the FDA

7 reviewers do, right?

8 MS. KING: Objection. Form.

9 THE WITNESS: I don't -- I

10 don't know that I review them

11 differently inasmuch as I just

12 performed a systematic review, but I'm

13 considering the totality of data, not

14 just siloed data.

15 QUESTIONS BY MR. MURDICA:

16 Q. Okay. In other words, you

17 don't know what FDA reviewed or didn't

18 review; is that what you're saying?

19 A. Not in total.

20 Q. Okay. So if you were to -- I

21 know you haven't done any studies on

22 acetaminophen.

23 If you were to do one, what

24 would you do in your lab or -- well, you

25 can't do one in your lab. If you were to do

Page 345

1 one in a lab, what would you do?

2 A. Are you just asking me to

3 design an acetaminophen study?

4 Q. Yeah.

5 Have you thought about it?

6 A. I have.

7 Q. Okay. And what would you do?

8 A. So our normal study design, we

9 would -- we would actually follow guidelines.

10 We do guideline studies predominantly in my

11 laboratory, so we would follow study

12 guidelines in regard to animal models and the

13 number of animals required.

14 We would do exposures. Our

15 exposures, we would include a dose-response

16 in regards to exposures, typically at the

17 minimum, two-dose, but typically three

18 dosages.

19 And we would determine changes

20 in maternal weight to make sure there's not

21 maternal toxicity per se, and then we would

22 look at the weight of the dam throughout

23 pregnancy. We would look at the weight of

24 the pups when they're born.

25 And then we would divide them

<p style="text-align: right;">Page 346</p> <p>1 up beforehand blindly between what their</p> <p>2 exposure was or non-exposure into different</p> <p>3 testing groups, and those would go then</p> <p>4 downstairs into the behavioral testing</p> <p>5 facility for analysis.</p> <p>6 Q. And you would give them the</p> <p>7 same behavioral tests that we talked about</p> <p>8 earlier, the three-chamber test, for example?</p> <p>9 A. That is one test that we could</p> <p>10 run, yes.</p> <p>11 Q. Okay. You don't have any</p> <p>12 additional or special tests compared to</p> <p>13 what's in the literature?</p> <p>14 A. I don't know about special. A</p> <p>15 lot of -- our strength is that it's -- our</p> <p>16 system has largely been automated, so we can</p> <p>17 do tracking that doesn't require an</p> <p>18 attendant. You can review the data, but it's</p> <p>19 largely automated to remove any potential</p> <p>20 bias.</p> <p>21 So you're blinded to the</p> <p>22 treatment of the animals and the groups, and</p> <p>23 the machines do the -- do the data</p> <p>24 collection.</p> <p>25 Q. And the data you collect in</p>	<p style="text-align: right;">Page 348</p> <p>1 "nonclinical data"?</p> <p>2 A. Can you give me the Bates</p> <p>3 number on that?</p> <p>4 Q. Sure. It's 147 at the bottom.</p> <p>5 The top of the page, second paragraph.</p> <p>6 A. Okay.</p> <p>7 Q. So, Dr. Cabrera, you know,</p> <p>8 because we talked about it earlier and you</p> <p>9 volunteered, that around this time, FDA came</p> <p>10 out with a statement about ADHD and</p> <p>11 acetaminophen, right?</p> <p>12 A. Could you repeat the question?</p> <p>13 Q. FDA issued a statement -- a</p> <p>14 guidance online about ADHD and acetaminophen</p> <p>15 and said they would continue to monitor the</p> <p>16 data, but essentially recommendations on use</p> <p>17 haven't changed?</p> <p>18 A. I'm familiar with that</p> <p>19 statement.</p> <p>20 Q. Okay. And you see here the</p> <p>21 conclusions that led to it internally, right?</p> <p>22 Oh, sorry.</p> <p>23 A. I see specifically the</p> <p>24 paragraph, their comments in regards to the</p> <p>25 animal studies.</p>
<p style="text-align: right;">Page 347</p> <p>1 your hypothetical study would only be as good</p> <p>2 as the model is in terms of measuring those</p> <p>3 behaviors that you associate to human autism</p> <p>4 and ADHD outcomes, correct?</p> <p>5 MS. KING: Objection. Form.</p> <p>6 THE WITNESS: If -- I mean, in</p> <p>7 turn, the model is as good as the</p> <p>8 model can be, and as a potential</p> <p>9 comparison, we could do a valproic</p> <p>10 acid exposure as a -- as a control in</p> <p>11 addition to treatment with</p> <p>12 acetaminophen.</p> <p>13 QUESTIONS BY MR. MURDICA:</p> <p>14 Q. But even valproic acid doesn't</p> <p>15 induce autism or ADHD in every exposure,</p> <p>16 right?</p> <p>17 A. It produces autism core</p> <p>18 behaviors in a majority of animals, but not</p> <p>19 in every animal.</p> <p>20 Q. If you turn to 147, which is</p> <p>21 like the third page in on this, and you look</p> <p>22 at the second paragraph down.</p> <p>23 Now, this is -- this is talking</p> <p>24 about 2016.</p> <p>25 Do you see where it says</p>	<p style="text-align: right;">Page 349</p> <p>1 Q. Right.</p> <p>2 Okay. And this is what I</p> <p>3 was -- this is what I relayed to you before,</p> <p>4 right, that behavioral responses in animals</p> <p>5 that are most likely predictive of an ADHD</p> <p>6 response in humans are uncertain and,</p> <p>7 therefore, additional animal studies are not</p> <p>8 likely to be informative.</p> <p>9 That was their view, right?</p> <p>10 A. That is a quote in this</p> <p>11 document.</p> <p>12 Q. Okay. And then the next</p> <p>13 paragraph on March 1st of 2016, whoever was</p> <p>14 doing this review at FDA agreed, the data did</p> <p>15 not support a causal association between</p> <p>16 acetaminophen and ADHD at the time, and the</p> <p>17 TSI would be closed?</p> <p>18 A. I see that as well.</p> <p>19 Q. Yeah.</p> <p>20 And you know you disagree with</p> <p>21 that today, but you don't know if you would</p> <p>22 have disagreed with that in 2016, right?</p> <p>23 A. I do not know.</p> <p>24 Q. Okay. All right. And then if</p> <p>25 you look down at the bottom of the page,</p>

<p style="text-align: right;">Page 350</p> <p>1 there was also human data reviewed, and this 2 was later. This was a year later. 3 And the reviewers said, 4 "Although we have more studies, we do not 5 have higher quality data to better inform 6 drug causality, and with these findings being 7 in clinical practice, all of these studies 8 had significant limitations, uncertainty and 9 critical missing information that precludes 10 reliable inference of drug attribution." 11 Do you see that? 12 A. So I -- just to be fair, the 13 statement begins with "We acknowledge the 14 consistency of findings of positive 15 association between APAP and adverse 16 neurodevelopmental outcomes in the majority 17 of published observational studies reviewed 18 to date." 19 And then it follows, "Although 20 we have more studies, we do not have higher 21 quality data to better inform drug causality 22 and what these findings mean in clinical 23 studies. All of these studied has 24 significant limitations, uncertainties and 25 critical missing information that precede --</p>	<p style="text-align: right;">Page 352</p> <p>1 questionnaires in order to collect the data 2 based on maternal recall. 3 And just to reiterate, 4 generally maternal recall would bias towards 5 the null, not away from. 6 Q. Well, that's -- I understand 7 you're saying that generally, but in the case 8 of surveying for mothers for children with 9 neurodevelopmental issues, you know it's the 10 opposite, right? The -- there is a bias for 11 responders for children that actually have 12 the condition, right? 13 A. Well, if -- that would assume 14 that they were developing a bias based on 15 they're not sure what they're supposed to be 16 recalling in regards to that bias. 17 Q. Well, did you see, Dr. Cabrera, 18 that in some of the studies -- some of the 19 surveys, the questionnaires, large 20 percentages of the respondents were lost to 21 follow-up over the years because some of 22 these went to, you know, age 7 of the 23 children, right? 24 A. That does happen. 25 Q. Right.</p>
<p style="text-align: right;">Page 351</p> <p>1 preclude reliable inference of drug 2 attribution." 3 Q. Right. 4 And you're familiar with the 5 ADHD studies that existed as of February 6 2017, right? 7 A. I've reviewed them. 8 Q. Yeah. 9 And we haven't gone through all 10 of them, and it would -- it would take a 11 while to do so, and we're not going to do 12 that today. 13 But you know that many of them 14 were -- they were data collected essentially 15 by surveys, right? 16 A. Several of them were survey 17 data. 18 Q. Yeah. 19 And they relied on maternal 20 memory sometimes years after the pregnancy, 21 right? 22 A. I -- I'm not going to comment 23 generally on how close temporality -- 24 temporally they were to when they collected 25 the data, but several of the studies did use</p>	<p style="text-align: right;">Page 353</p> <p>1 And it happened in the studies. 2 You saw that, right? 3 A. It does happen. 4 Q. Yeah. 5 And the people who were still 6 responding at year 7 are biased towards 7 mothers who are concerned about their 8 children that actually have problems, right? 9 MS. KING: Objection. Form. 10 THE WITNESS: I don't know that 11 that's a bias in that regard, but 12 there may be -- and I'd have to look 13 specifically at that, whether that 14 was -- there was a correlation between 15 having an affected child and not being 16 lost to follow-up. 17 MR. MURDICA: Okay. Why don't 18 we take a break at this point. I need 19 about five minutes, just figure out 20 what the last bit we're going to do 21 is. 22 Does that work for you, Doctor? 23 THE WITNESS: I can do that. 24 VIDEOGRAPHER: Off the record, 25 4:36.</p>

Page 354

1 (Off the record at 4:36 p.m.)

2 VIDEOGRAPHER: The time is

3 4:56 p.m., back on the record. The

4 beginning of Media 7.

5 QUESTIONS BY MR. MURDICA:

6 Q. All right. Dr. Cabrera, are

7 you ready to proceed?

8 A. Yes, I am.

9 Q. Okay. Doctor, we're going to

10 talk about some things that Dr. Cabrera

11 believes acetaminophen can and cannot cause.

12 Okay?

13 Can acetaminophen, in the

14 opinion of Dr. Cabrera, cause neural tube

15 defects?

16 A. Only at doses that wouldn't --

17 that would be outside the normal intake.

18 Q. Okay. So I'm -- that's a good

19 point. I'm going to limit my questions to

20 therapeutic -- normal therapeutic doses in

21 line with the labeling.

22 For a normal therapeutic dose,

23 does Dr. Cabrera believe that acetaminophen

24 causes major congenital malformations in

25 human beings?

Page 355

1 A. I've only seen one study that

2 would support that in regards to the National

3 Birth Defects Prevention Study, and that

4 wouldn't be enough data to draw that

5 conclusion.

6 Q. Okay. Does Dr. Cabrera believe

7 that acetaminophen at a therapeutic dose can

8 cause trisomy in an offspring?

9 A. I haven't seen any data that

10 would support that it would cause a trisomy.

11 Q. Okay. Does Dr. Cabrera believe

12 that acetaminophen at a therapeutic dose in

13 any human, not just during pregnancy, can

14 cause hard cancers?

15 A. Solid tumors, is that --

16 Q. Solid tumors.

17 A. I've only seen data, as I've

18 indicated in my report, consistent with

19 leukemias, not solid tumors.

20 Q. Okay. So the answer on solid

21 tumors would be no, right?

22 A. Correct.

23 Q. Has Dr. Cabrera seen enough

24 data to say that acetaminophen at therapeutic

25 doses can cause and does cause leukemia in

Page 356

1 patients taking acetaminophen?

2 A. I've seen data that supports

3 that. I haven't done a causality analysis in

4 that regard, but I would say there's data

5 that's consistent with causality. But I

6 haven't performed a causality analysis for

7 that.

8 Q. Okay. And the data that you've

9 seen that you say is consistent with

10 causality relies on induced de novo

11 mutations, essentially, from acetaminophen as

12 a pathway, correct?

13 A. It's oxidative damage that can

14 increase the risk of de novo mutations.

15 Q. Right.

16 And --

17 A. And chromosome breaks.

18 Q. -- and Dr. Cabrera knows that

19 if that was true, you'd also see solid tumors

20 as well as blood cancers, correct?

21 A. Not necessarily, as solid

22 tumors weren't found in the animal models,

23 nor have I seen reports in humans for solid

24 tumors in that regard.

25 Q. Okay.

Page 357

1 A. And I'll add that it,

2 oftentimes, particularly may affect highly

3 proliferative cells. And that may be why

4 it's leukemias as opposed to other solid

5 tumors.

6 Q. In any event, as of today,

7 Dr. Cabrera hasn't seen enough to say and put

8 out for the world that you believe

9 acetaminophen in therapeutic doses causes

10 blood cancers, do you?

11 A. I haven't conducted a causality

12 analysis on that, so I would not be willing

13 to make that opinion.

14 Q. Okay. What confounders should

15 we be accounting for in assessing causality

16 between acetaminophen exposure and the

17 pregnancy outcomes of discussion ASD and

18 ADHD?

19 A. So to be clear, our animal

20 models remove those confounders. That's one

21 of the strengths of them. And so we don't

22 have to worry about environmental or genetic

23 confounders in our animal models. But I can

24 also speak specifically in regards to human

25 studies as well, if you'd like.

Page 358

1 Q. Yeah, let's talk about human
2 studies.
3 What confounders should be
4 taken into account?
5 A. So some of the things that have
6 also been determined as risk factors, and
7 we've talked about earlier, so potentially
8 smoking or the use of other medications. And
9 that would include things like valproic acid,
10 exposures to heavy metals, whether those are
11 environmental or occupational exposures.
12 And as a more general
13 statement, you need to consider -- those are
14 just known risk factors in that regard. You
15 need to consider all the various factors in
16 order to do a weighted analysis for that.
17 Q. How about maternal or paternal
18 ADHD?
19 A. You have to consider this as a
20 potential risk in that there may be some
21 genetic liability as well if there's maternal
22 or paternal ADHD or ASD, even, for that
23 matter, present on the mother or father.
24 It's a potential genetic component.
25 Q. Particularly if the offspring

Page 359

1 ends up with ADHD and the parents or parent
2 have ADHD, even Dr. Cabrera would be
3 suspicious of a genetic cause there, right?
4 A. I don't know about "even
5 Dr. Cabrera," but actually one of the first
6 things we do is normally conduct a genetic
7 analysis.
8 Q. Okay. Because you would be
9 suspicious for genetics as a cause there,
10 right?
11 A. Well, it's because it's one of
12 the tools we have in the laboratory. We like
13 to apply the tool to see if there is a
14 genetic cause. It's --
15 Q. Right.
16 A. -- an open question that we
17 normally apply upfront.
18 Q. And if the parents have the
19 condition, you're not doing it for laughs;
20 you're doing it because you suspect that's a
21 possibility, right?
22 A. Yeah, we do -- typically we do
23 a trio analysis, and we'll look for rare
24 variance or mutations in the mother or
25 father, or look for de novo mutations as

Page 360

1 well. So you could have two rare mutations
2 come together in the offspring and that could
3 increase disease risk, or you could have de
4 novo mutations that could also increase
5 disease risk as potential genetic factors.
6 Q. Okay. Back to confounding in
7 human data that Dr. Cabrera believes we need
8 to account for here.
9 Is impulsivity in the mother a
10 risk factor?
11 A. I haven't seen specifically
12 impulsivity as a -- as a risk factor for
13 autism.
14 Q. How about anxiety?
15 A. I think there's some overlap in
16 regards to anxiety and autism or ADHD
17 behaviors, and so there -- that could be a
18 facet of the presentation that should be
19 considered.
20 Q. Okay. So anxiety in the mother
21 is something you would consider as potential
22 confounding?
23 A. Something in -- as reviewed --
24 if you think about this as a part of the
25 nurturing environment, then you have the

Page 361

1 potential for mom and dad to not just provide
2 genetics in regards to the offspring, but
3 also how they influence the environment; both
4 the in utero environment and also the
5 environment that the child would be exposed
6 to, you know, afterwards.
7 Q. Have you seen data on whether
8 anxiety in a mother increases the risk of
9 ADHD or autism in the child?
10 A. I've seen analysis on various
11 behavioral interactions. I'd have to look
12 back specifically for anxiety.
13 Q. Okay. Would Dr. Cabrera today
14 consider that confounding for the outcome of
15 interest or potentially confounding or not?
16 A. I think potentially it should
17 be considered if it -- particularly if it's
18 severe or debilitating.
19 Q. And if I asked you that same
20 series of questions for depression in the
21 mother, would I get the same answer?
22 A. Well, actually, slightly
23 different answers. And the question is
24 whether the depression is being treated and
25 with what other medications it could

<p style="text-align: right;">Page 362</p> <p>1 potentially being treated with, and you'd</p> <p>2 have to be concerned about potential</p> <p>3 exposures to those medications as well.</p> <p>4 Q. Okay. How about untreated</p> <p>5 depression, potentially confounding or no?</p> <p>6 A. It depends on the severity and</p> <p>7 whether it's -- has -- oftentimes, I'm sure</p> <p>8 you're aware, there can be risk behaviors</p> <p>9 associated with depression. And so you would</p> <p>10 need to account for that if there's</p> <p>11 particular risks associated with that</p> <p>12 depression.</p> <p>13 Q. Okay. Any other confounders</p> <p>14 you can think of other than the ones we</p> <p>15 discussed?</p> <p>16 A. So generally what is also often</p> <p>17 adjusted for is -- drinking or smoking is</p> <p>18 also usually adjusted for in those models as</p> <p>19 well.</p> <p>20 Q. One quick question, and this</p> <p>21 was just something I wasn't sure.</p> <p>22 In your report you have a</p> <p>23 biological gradient section, right?</p> <p>24 A. Okay.</p> <p>25 Q. And it says, "Meta-regression</p>	<p style="text-align: right;">Page 364</p> <p>1 rate of anxiety and depression?</p> <p>2 A. I've seen studies specific to</p> <p>3 neuroticism. I'm not sure in regards to</p> <p>4 anxiety and depression.</p> <p>5 Q. Okay. You didn't have any</p> <p>6 citation in your report to any study like</p> <p>7 that, right?</p> <p>8 A. Initially, no. I did review</p> <p>9 some of the work -- or some of the references</p> <p>10 by Dr. Chung in that regard.</p> <p>11 Q. Okay. Have you ever seen a</p> <p>12 study by Bandoli? Does that sound familiar</p> <p>13 to you?</p> <p>14 A. I need to see the study to let</p> <p>15 you know.</p> <p>16 Q. Okay. I'm going to mark it and</p> <p>17 hand it to you.</p> <p>18 MS. JOHNSTON: 18?</p> <p>19 MR. MURDICA: It's going to be</p> <p>20 18, yeah.</p> <p>21 (Cabrera Exhibit 18 marked for</p> <p>22 identification.)</p> <p>23 QUESTIONS BY MR. MURDICA:</p> <p>24 Q. Doctor, you now have in front</p> <p>25 of you what's been marked as Exhibit 18.</p>
<p style="text-align: right;">Page 363</p> <p>1 analyses indicate," and I think there's two</p> <p>2 that you were referring to.</p> <p>3 Do you happen to know, as you</p> <p>4 sit here today, what you were referring to</p> <p>5 there with meta-regression analyses, by any</p> <p>6 chance?</p> <p>7 A. Could you tell me what page</p> <p>8 that's on?</p> <p>9 Q. Yeah, it's 191.</p> <p>10 A. Okay. That was my reference to</p> <p>11 meta-analysis that was performed at the</p> <p>12 meta-analysis that I reviewed.</p> <p>13 Q. Yeah.</p> <p>14 Do you know which one?</p> <p>15 A. I reviewed all the ones I could</p> <p>16 find, and they're in my report.</p> <p>17 Q. Oh, okay. So it was the prior</p> <p>18 meta-analyses in your report.</p> <p>19 A. Yes.</p> <p>20 Q. Got it.</p> <p>21 Back to the questions I just</p> <p>22 asked about depression and anxiety. Are you</p> <p>23 aware that there are studies showing that the</p> <p>24 population of acetaminophen users have a much</p> <p>25 higher rate of -- the moms have a much higher</p>	<p style="text-align: right;">Page 365</p> <p>1 Take as long as you need to</p> <p>2 review it. I can tell you that my question</p> <p>3 is going to be on page 5 under the topic --</p> <p>4 under the section Characteristics of Women By</p> <p>5 Duration of Use.</p> <p>6 Do you want to go off the</p> <p>7 record, Doctor?</p> <p>8 A. I just finished.</p> <p>9 Q. Oh, okay.</p> <p>10 Okay. Doctor, I know your</p> <p>11 counsel had volunteered that he had reviewed</p> <p>12 this paper before today and knew it by name</p> <p>13 and year, but I take it Dr. Cabrera didn't</p> <p>14 know about?</p> <p>15 A. I had looked over it in regards</p> <p>16 to some of the interactions.</p> <p>17 Q. Okay. And you see, and I</p> <p>18 directed you to the section, that the -- in</p> <p>19 this study of the 1,515 women who reported</p> <p>20 prospectively acetaminophen use during</p> <p>21 pregnancy, the ones that had the longest use</p> <p>22 were more likely, among other things, to</p> <p>23 report depression or anxiety, right?</p> <p>24 A. That is consistent with the</p> <p>25 fourth paragraph on page 5.</p>

<p>Page 366</p> <p>1 Q. Okay. And is the possibility 2 of confounding from the symptoms of 3 depression and anxiety in long-term users 4 during pregnancy something you considered in 5 your opinions before you rendered them?</p> <p>6 A. Inasmuch as these are things 7 that could be influencing the population. 8 They would also -- with the expectation that 9 a particular exposure to a -- to 10 acetaminophen could have some correlations 11 with depression, anxiety or mental health. 12 I'm not aware that depression, anxiety or 13 mental health themselves can cause the 14 condition of ADHD or ASD in the offspring.</p> <p>15 Q. Notwithstanding that, 16 Dr. Cabrera, in this study, at least, 17 long-term users were different than other 18 users in terms of their weight, their tobacco 19 use, their use of antidepressants in 20 pregnancy and their depression and anxiety, 21 right?</p> <p>22 A. Right. So, well, weight, it 23 should be adjusted for. And as I already 24 mentioned, potentially alcohol or smoking 25 should be adjusted for.</p>	<p>Page 368</p> <p>1 that one of the studies that you cited, 2 Richey from this year, determined that there 3 wasn't enough homogeneity among the autism 4 data that's out there in humans to conduct a 5 meta-analysis?</p> <p>6 A. Are you -- are you referring to 7 the -- the heterogeneity analysis in Richey?</p> <p>8 Q. Yes.</p> <p>9 A. I am familiar with that Richey 10 analysis in regard to the -- they refer to as 11 a heterogeneity analysis.</p> <p>12 Q. Okay.</p> <p>13 A. Typically indicated as an 14 I-squared value.</p> <p>15 Q. Right.</p> <p>16 The data wasn't similar enough 17 to put it all together in a meta-analysis in 18 plain language, correct?</p> <p>19 A. There was -- there was -- and I 20 don't know about it wasn't similar enough, 21 but there was -- the studies have been 22 conducted in different ways to create some 23 difficulties in that regard.</p> <p>24 Q. Right.</p> <p>25 And you don't deny that Richey,</p>
<p>Page 367</p> <p>1 Q. And the studies you looked at 2 didn't adjust for depression or anxiety, 3 correct?</p> <p>4 A. Some of them -- I have to look 5 specifically in that regard, but using 6 measures of depression or anxiety, I don't 7 recall those specifically mentioned variables 8 in the studies I reviewed.</p> <p>9 Q. Okay. And those are not things 10 that Dr. Cabrera adjusted for in his 11 causation analysis when evaluating the 12 studies, correct?</p> <p>13 A. As I indicated, I'm unaware 14 that depression or anxiety in and of 15 themselves can cause an adverse outcome in 16 the offspring.</p> <p>17 Q. So accordingly, you didn't 18 adjust for it, right?</p> <p>19 A. I didn't know that they're a 20 risk factor in that regard. And as I 21 mentioned, unless they're associated with a 22 risk exposure and then those should be 23 adjusted for.</p> <p>24 Q. Okay. Dr. Cabrera, in your 25 review of human autism studies, did you note</p>	<p>Page 369</p> <p>1 at least, determined that it wasn't possible 2 to do a meta-analysis on the existing human 3 data with autism and acetaminophen?</p> <p>4 A. I mean, we can look 5 specifically at Richey. I don't -- I don't 6 think I drew any specific conclusions in 7 regards to what Richey said about that. We 8 can look at it specifically, though.</p> <p>9 Q. Okay. You don't recall whether 10 or not Richey determined that a meta-analysis 11 couldn't be done?</p> <p>12 A. Well, they did a meta-analysis. 13 I think you're asking me some very specifics 14 about the meta-analysis that they did, and I 15 think we should look at the study if you want 16 to discuss specifics about Richey. 17 (Cabrera Exhibit 19 marked for 18 identification.)</p> <p>19 QUESTIONS BY MR. MURDICA:</p> <p>20 Q. Okay. If I have time, we will. 21 I'm going to move to the next 22 one first.</p> <p>23 We talked about meconium 24 earlier, and you know there's a meconium 25 study with respect to ADHD and acetaminophen,</p>

<p style="text-align: right;">Page 370</p> <p>1 right, Doctor?</p> <p>2 A. Yes, I do.</p> <p>3 Q. And this is -- do you see it's</p> <p>4 in front of you marked as Exhibit 19?</p> <p>5 A. Yes, I do.</p> <p>6 Q. And this is something that you</p> <p>7 looked at and relied on in your paper, right?</p> <p>8 A. Yes, it is.</p> <p>9 Q. And, in fact, this is something</p> <p>10 that you changed regarding this paper in your</p> <p>11 amended report, right, we talked about</p> <p>12 earlier.</p> <p>13 A. I -- I did mention as far as</p> <p>14 the period of exposure, that was consistent</p> <p>15 with meconium.</p> <p>16 Q. Okay. If you turn to page 5 of</p> <p>17 Exhibit 19, I'm going to ask you a question</p> <p>18 on the third paragraph -- a couple questions,</p> <p>19 actually.</p> <p>20 So my first question is this,</p> <p>21 the authors of this study write, "No single</p> <p>22 observational study is sufficient for causal</p> <p>23 inference, and more observational studies</p> <p>24 using direct measurements of fetal</p> <p>25 acetaminophen exposure are needed."</p>	<p style="text-align: right;">Page 372</p> <p>1 have examined the potential mechanisms</p> <p>2 mediating the association of prenatal</p> <p>3 acetaminophen exposure with neurodevelopment,</p> <p>4 a key component for assessing the potential</p> <p>5 for causation."</p> <p>6 Did I read that correctly?</p> <p>7 A. I -- you did, yes.</p> <p>8 Q. Okay. And as of September 28,</p> <p>9 2020, do you disagree with that?</p> <p>10 A. I would say there had been</p> <p>11 numerous mechanistic studies, but nothing</p> <p>12 that had put all of the steps in regards to</p> <p>13 neurodevelopmental toxicity together.</p> <p>14 Q. Okay. By the way, do you know</p> <p>15 any of the authors of this study?</p> <p>16 A. I'm familiar with Andrea</p> <p>17 Baccarelli.</p> <p>18 Q. And you know Baccarelli is one</p> <p>19 of the plaintiffs' experts in this</p> <p>20 litigation, right?</p> <p>21 A. I'm aware.</p> <p>22 Q. Okay. You don't disagree with</p> <p>23 Dr. Baccarelli's statements that I just read</p> <p>24 to you?</p> <p>25 A. I do not.</p>
<p style="text-align: right;">Page 371</p> <p>1 Do you see that sentence?</p> <p>2 A. Yes, I do.</p> <p>3 Q. Okay. Do you agree with that,</p> <p>4 as of the publication date of this article?</p> <p>5 A. I -- at the time there was</p> <p>6 only, I believe, the one cord blood study in</p> <p>7 regard to -- actually, this is -- well, it</p> <p>8 depends on the endpoint.</p> <p>9 So there was -- for ADHD --</p> <p>10 well, as far as measuring concentrations, we</p> <p>11 had the cord blood study that we already</p> <p>12 mentioned.</p> <p>13 And so we would prefer to have</p> <p>14 some sort of replication in that regards.</p> <p>15 Q. Right.</p> <p>16 These authors thought that more</p> <p>17 observational studies were needed using</p> <p>18 direct measurements of fetal acetaminophen</p> <p>19 exposure to reach causal inference, correct?</p> <p>20 A. And that is what they say, yes.</p> <p>21 Q. And that was as of 2020,</p> <p>22 correct, September 28, 2020?</p> <p>23 A. That is what is indicated, yes.</p> <p>24 Q. Okay. In going down a couple</p> <p>25 sentences, it says, "Third, no prior studies</p>	<p style="text-align: right;">Page 373</p> <p>1 Q. Okay. Dr. Baccarelli and his</p> <p>2 colleagues include a strengths and</p> <p>3 limitations section at the end of the</p> <p>4 article.</p> <p>5 My question for you is, on</p> <p>6 page 11 where Dr. Baccarelli and his</p> <p>7 colleagues write, "Another possibility is</p> <p>8 confounding by unknown genetic, social and</p> <p>9 familial factors associated with</p> <p>10 acetaminophen use."</p> <p>11 Just -- sorry.</p> <p>12 A. Where exactly?</p> <p>13 Q. Yeah.</p> <p>14 A. Last page?</p> <p>15 Q. Yeah. About halfway down from</p> <p>16 the top.</p> <p>17 A. Got it.</p> <p>18 Q. Do you see that sentence,</p> <p>19 "Another possibility is confounding by</p> <p>20 unknown genetic, social and familial factors</p> <p>21 associated with acetaminophen use"?</p> <p>22 A. Yes, I do.</p> <p>23 Q. Okay. And do you acknowledge</p> <p>24 that that's a possibility?</p> <p>25 A. I acknowledge that it's a</p>

<p style="text-align: right;">Page 374</p> <p>1 possibility. I also knowledge that he 2 followed that up with, "This concern has been 3 recently addressed with negative control 4 exposure analysis, maternal acetaminophen -- 5 acetaminophen use before and after pregnancy 6 and a partner's acetaminophen use were not 7 associated with child ADHD in populations in 8 which maternal acetaminophen use during 9 pregnancy increased the risk." 10 Q. Right. 11 And my question is, 12 Dr. Baccarelli and colleagues are 13 acknowledging that unknown genetic, social 14 and familial factors associated with 15 acetaminophen use are still a possibility, 16 although he cites one study that he believes 17 addresses it, correct? 18 MS. KING: Objection to form. 19 THE WITNESS: To be clear, he 20 actually cites three studies that 21 refute that, that being both the 22 negative control exposure studies. 23 And then he follows that by 24 saying, "Furthermore, our study 25 population has high genetic and</p>	<p style="text-align: right;">Page 376</p> <p>1 Q. I -- that's what Dr. Cabrera 2 believes, correct? 3 A. That's the reality we live in. 4 Q. Okay. Well, Dr. Cabrera, 5 you've seen today that I've shown you 6 everybody in the world disagrees with you 7 except other plaintiffs' experts? 8 MS. KING: Objection. Form. 9 QUESTIONS BY MR. MURDICA: 10 Q. So I appreciate your answer, 11 but I'll ask Dr. Baccarelli about this in two 12 weeks. 13 MS. KING: Objection. Form. 14 QUESTIONS BY MR. MURDICA: 15 Q. Do you disagree, Dr. Cabrera, 16 with this sentence that Dr. Baccarelli and 17 colleagues wrote, "confounding by unmeasured 18 our unknown factors is always a possibility 19 in relation to the effects observed in this 20 study"? 21 A. As I indicated, I -- my reading 22 of that is that he's indicating he's -- or 23 referencing unmeasured confounding and 24 as a -- or unknown confounding, and so 25 that's -- it is a possibility.</p>
<p style="text-align: right;">Page 375</p> <p>1 sociodemographic homogeneity." 2 So he's rejecting that 3 possibility also within reference 50 4 as well. 5 QUESTIONS BY MR. MURDICA: 6 Q. Okay. If you look at the first 7 sentence on this page, Dr. Cabrera, 8 Dr. Baccarelli and colleagues also write, 9 "Confounding by unmeasured or unknown risk 10 factors is always a possibility." 11 Correct? 12 A. He did write that. 13 Q. Do you disagree with him on 14 that? 15 A. Well, I will make the general 16 statement, there's always the potential for 17 residual confounding, and I believe that's 18 what he's referencing there. 19 Q. Yeah. And that's what 20 Dr. Chung attributes the associations in some 21 of the studies to, right? 22 A. Right, but it's -- based on the 23 analysis that's been done, it's not 24 sufficient to account for the increased risk 25 that's been reported in multiple studies.</p>	<p style="text-align: right;">Page 377</p> <p>1 You can't control every 2 variable in that regard, but they've also 3 accounted for that as well. 4 Q. They accounted for -- oh, 5 really? They unaccounted for unmeasured and 6 unknown factors? 7 A. Well, you can't -- you can't 8 account for the unknown. 9 Q. Okay. 10 A. But the whole point is through 11 using their methods of analysis, they're, I 12 would say, mitigating that as much as 13 possible. 14 Q. Okay. But they didn't write 15 that because they don't believe it's a 16 possibility, right? 17 A. You don't -- you don't know 18 what you don't know that. 19 Q. Okay. We can agree on that, 20 Dr. Cabrera. 21 All right. Let's go on to the 22 next one. 23 All right. Dr. Cabrera, do you 24 agree that 70 percent of adverse birth 25 outcomes are of an unknown cause?</p>

Page 378

1 MS. KING: Objection. Form.

2 THE WITNESS: Can you repeat

3 the question?

4 QUESTIONS BY MR. MURDICA:

5 Q. Sure.

6 Dr. Cabrera, do you believe

7 that 70 percent of adverse birth outcomes are

8 of an unknown -- or from an unknown cause?

9 A. I believe I have indicated that

10 before.

11 Q. You've testified to that before

12 under oath, correct?

13 A. That's correct.

14 Q. Okay. And you stand by that?

15 A. I would say that over time

16 we learn more, and over time, that percentage

17 has gotten smaller.

18 Q. Do you agree that most issues

19 with the fetal-developing brain are for

20 as-yet unknown reasons?

21 MS. KING: Objection. Form.

22 THE WITNESS: We -- as -- over

23 time, we've learned more about the

24 particular genetic and environmental

25 factors can impact those.

Page 379

1 And I would say it's -- it

2 would be fair that we're maybe

3 approaching, and we can determine

4 risks, both environmental and genetic,

5 for the majority of cases now.

6 QUESTIONS BY MR. MURDICA:

7 Q. Okay. Understanding that when

8 you said it under oath five years ago, you

9 believed it was true then, right?

10 A. Yes.

11 Q. Okay. When you said under oath

12 five years ago that animal -- knockout animal

13 models haven't been fruitful in converting to

14 human effect, did you mean that?

15 MS. KING: Objection. Form.

16 If you're going to quote from

17 his testimony, I would ask that you

18 show it to him.

19 MR. MURDICA: Okay.

20 QUESTIONS BY MR. MURDICA:

21 Q. Do you agree with that or no?

22 A. I think our knockout models

23 have done fairly well in some regards for

24 animal models of human disease.

25 Q. Has that changed in the last

Page 380

1 five years?

2 A. Well, there -- there's still

3 mouse models in that regard, but I think they

4 are informative into understanding the --

5 particularly when we find rare mutations, and

6 we make animal models.

7 I'm currently working on a

8 mouse model with the rare gene mutation

9 that's also associated with autism, and the

10 animal model has been very informative.

11 Q. And that's changed in the last

12 five years?

13 A. It's on a case-by-case basis.

14 (Cabrera Exhibit 20 marked for

15 identification.)

16 QUESTIONS BY MR. MURDICA:

17 Q. Okay. Last exhibit. We talked

18 a little bit about Ystrom.

19 Do you remember that,

20 Dr. Cabrera?

21 A. Yes.

22 Q. Mark that.

23 You should have Exhibit 20 in

24 front of you now, Dr. Cabrera.

25 A. Yes, I do.

Page 381

1 MS. KING: Can I have a copy?

2 MR. MURDICA: Yes.

3 QUESTIONS BY MR. MURDICA:

4 Q. All right. Dr. Cabrera, do you

5 remember I asked you if impulsivity was

6 associated with acetaminophen use during

7 pregnancy?

8 A. Yes, I do.

9 Q. Okay. If you look on page 2 in

10 the second column, will you agree with me

11 that this group found that that -- previously

12 found that that was the case?

13 It's the second sentence in the

14 middle column on page 2.

15 A. I do see that, yes.

16 Q. Okay. And assuming that's

17 true -- well, they obviously claim they found

18 it, and they have a citation, right?

19 A. They do.

20 Q. Have you looked at that

21 citation, Doctor?

22 A. Yeah. I believe they're

23 referencing their previous work.

24 Q. Okay. Is that a potential sign

25 of confounding that you need to count --

Page 382

1 account for?

2 A. Impulsivity?

3 Q. A trait in the maternal

4 population that uses acetaminophen that seems

5 to be common.

6 A. I --

7 MS. KING: Objection. Form.

8 THE WITNESS: As I previously

9 indicated, I -- I'm unaware that

10 impulsivity as a trait can necessarily

11 lead to adverse outcome.

12 QUESTIONS BY MR. MURDICA:

13 Q. Dr. Cabrera, impulsivity could

14 be a symptom of an underlying condition

15 that could be associated with the two

16 outcomes we are interested in, correct?

17 MS. KING: Objection. Form.

18 THE WITNESS: I would say that

19 there's -- impulsivity could be --

20 there could be overlap between ADHD

21 and impulsivity.

22 QUESTIONS BY MR. MURDICA:

23 Q. Okay. If you'd turn to

24 Table 1.

25 This is the -- essentially the

Page 383

1 outcome table from their study, right?

2 A. Yes, it is.

3 Q. Okay. And if you look at the

4 far right, the last row, last column for

5 mothers who were exposed to acetaminophen in

6 all three trimesters, the adjusted confidence

7 interval is not statistically significant,

8 correct?

9 A. In the fully adjusted model,

10 it's -- there's still an increased risk.

11 It's 1.27, and confidence interval goes from

12 0.99 to 1.63. It would not be statistically

13 significant based on --

14 Q. And if you look --

15 A. -- crossing 1.

16 Q. Thank you, Dr. Cabrera.

17 And if you look further up in

18 that column, you'll see there's quite a bit

19 of inconsistency between uses in the

20 different trimesters.

21 For example, there's no

22 statistical significance for use in the

23 second and third or first and third

24 trimester, but there is for the first and

25 second trimesters.

Page 384

1 Right?

2 MS. KING: Objection. Form.

3 THE WITNESS: I will say

4 there is consistency in that there's

5 an increased risk in each one of their

6 models, in regards to model 1, model 2

7 and model 3, consistently show an

8 increased risk, although not

9 consistently statistically

10 significant.

11 QUESTIONS BY MR. MURDICA:

12 Q. Right.

13 In fact, in their adjusted

14 model, the majority of the outcomes are not

15 statistically significant, right?

16 A. In their fully adjusted model,

17 as they have applied more adjustments, the

18 odds ratios remain positive, but there

19 appears to be three that would not cross 1 in

20 regards to their confidence intervals.

21 Q. Well, if you look at the far

22 right, there's more than three, right? Only

23 one -- only three of them do have statistical

24 significance, right?

25 A. Right. That's three of them do

Page 385

1 not cross 1.

2 Q. Okay. Sorry.

3 The rest of them, Dr. Cabrera,

4 so seven or eight of them, are not

5 statistically significant, right?

6 A. Still an increase in risk, but

7 they're not statistically significant.

8 Q. Okay. And this is another one

9 of those studies where all this document is

10 used at some particular time for some

11 particular duration in a trimester, not a

12 length of use or the actual portion of the

13 trimester when the use was, correct?

14 A. Yes. So this -- their analysis

15 is largely based on duration of use. It

16 doesn't necessarily tell you within a

17 trimester when it was used.

18 Q. And that's unfortunate from a

19 perspective of a teratologist like yourself,

20 right?

21 MS. KING: Objection. Form.

22 THE WITNESS: The more

23 information we have on the dose and

24 the duration and the frequency of

25 exposure, the better.

Page 386

1 QUESTIONS BY MR. MURDICA:

2 Q. Okay. And if we turn to the

3 very end of the study in conclusions, the

4 last two sentences -- the last sentence the

5 authors conclude, "We do not provide

6 definitive evidence for or against a causal

7 relation between maternal use of

8 acetaminophen and ADHD."

9 Do you see that?

10 A. I do see that.

11 Q. And based on the table we just

12 saw, you would agree, would you not,

13 Dr. Cabrera, that this study in and of itself

14 doesn't provide evidence for or against a

15 causal relationship between acetaminophen and

16 ADHD, correct?

17 A. An individual study typically

18 isn't going to provide enough data to

19 demonstrate a causal relation in that regard.

20 MR. MURDICA: Okay.

21 Anything else?

22 All right. I don't have

23 anything else.

24 Do you have any questions,

25 Rebecca?

Page 387

1 Oh, Sean's going to do it.

2 MR. WATTS: Sean, wake up.

3 MR. TRACEY: Yeah, I think I'm

4 going to do it. Can we take, like, a

5 five-minute break?

6 THE WITNESS: Please.

7 MR. TRACEY: Or do you want to

8 just roll now?

9 MR. WATTS: No, he wants to

10 take a five-minute break and go to the

11 restroom.

12 MS. KING: Five minutes? Is it

13 really five minutes?

14 VIDEOGRAPHER: Off the record,

15 5:36.

16 (Off the record at 5:36 p.m.)

17 VIDEOGRAPHER: The time is

18 5:49 p.m., back on the record.

19 Beginning of Media 8.

20 CROSS-EXAMINATION

21 QUESTIONS BY MR. TRACEY:

22 Q. Hi, Dr. Cabrera. How are you?

23 A. I'm doing well.

24 Q. I've got a few -- my name is

25 Sean Tracey, as you know. You and I have

Page 388

1 known each other for years, haven't we?

2 A. Yes, we have.

3 Q. I've got a few questions that I

4 want to ask you, and the first one is, you

5 have a lab called that's the Finnell/Cabrera

6 lab; is that right?

7 A. The Finnell/Cabrera Birth

8 Defects Research Laboratory.

9 Q. And what academic -- is that

10 associated with any academic institutions?

11 A. That's at Baylor College of

12 Medicine.

13 Q. Okay. And prior to Baylor

14 College of Medicine, was it affiliated with

15 another academic institution?

16 A. Prior to that, we were at the

17 University of Texas at Austin --

18 Q. And --

19 A. -- and also part of the Dell

20 Medical School.

21 Q. And are you known as a

22 principal investigator?

23 A. Yes, I am.

24 Q. What's a principal

25 investigator?

Page 389

1 A. That means I lead National

2 Institutes of Health-funded research.

3 Q. And what is the National

4 Institutes of Health?

5 A. Well, it's the governing body

6 of our health sciences in the United States.

7 Q. And what is the primary purpose

8 of the Finnell/Cabrera lab at Baylor College

9 of Medicine?

10 A. It's our -- our catch slogan is

11 prevention of preventable birth defects.

12 Q. Okay. And you mentioned your

13 boss a few times during the deposition.

14 Is that Rick Finnell?

15 A. Yes, it is.

16 Q. And what is Rick Finnell's job?

17 A. He's a clinical geneticist by

18 training, and currently the -- also a co-PI

19 in the laboratory and a chair in the -- in

20 our department.

21 Q. And how long have you worked

22 with Rick Finnell professionally?

23 A. I met Rick Finnell in 1995 as

24 an undergraduate student when I was appointed

25 to his lab by his wife as part of the honors

<p style="text-align: right;">Page 390</p> <p>1 program at Texas A&M University.</p> <p>2 Q. Okay. What percentage of the</p> <p>3 work at your lab deals in some form or</p> <p>4 fashion with genetics?</p> <p>5 A. I would say the majority of the</p> <p>6 work we do has -- deals with genetics.</p> <p>7 Q. But you're a teratologist,</p> <p>8 right?</p> <p>9 A. That is correct.</p> <p>10 Q. How does -- how does genetics,</p> <p>11 if it does, intersect with teratology?</p> <p>12 A. So part of what we do is we</p> <p>13 often start by looking at particular chemical</p> <p>14 exposures, and then we look for what's called</p> <p>15 gene environment interactions. And that is</p> <p>16 particular changes in genetics that increase</p> <p>17 the risk for an adverse outcome with an</p> <p>18 exposure.</p> <p>19 Q. And that's what you do in your</p> <p>20 lab, that's your day job.</p> <p>21 A. That's the bread and butter.</p> <p>22 Q. Okay. Do you remember during</p> <p>23 your -- Mr. Murdica's examination, he brought</p> <p>24 up this toxicogenomic database in the context</p> <p>25 of talking about some other databases.</p>	<p style="text-align: right;">Page 392</p> <p>1 chemical-gene/protein interactions,</p> <p>2 chemical-disease and gene-disease</p> <p>3 relationships. These data are integrated</p> <p>4 with functional and pathway data to aid in</p> <p>5 the development of hypotheses about the</p> <p>6 mechanisms underlying environmentally</p> <p>7 influenced diseases."</p> <p>8 Q. Let me stop you there for a</p> <p>9 second.</p> <p>10 That section that says</p> <p>11 "chemical-gene/protein interactions," is that</p> <p>12 what you do every day at your lab?</p> <p>13 MR. MURDICA: Object to the</p> <p>14 form.</p> <p>15 THE WITNESS: Yes, that's what</p> <p>16 I described just previously as gene</p> <p>17 environment interactions.</p> <p>18 QUESTIONS BY MR. TRACEY:</p> <p>19 Q. Okay. And then the next</p> <p>20 sentence says, "We also have additional</p> <p>21 ongoing projects involving manual curation of</p> <p>22 the exposome data and chemical-phenotype</p> <p>23 relationships to help identify pre-disease</p> <p>24 biomarkers resulting from experimental {sic}</p> <p>25 exposures."</p>
<p style="text-align: right;">Page 391</p> <p>1 Do you remember that?</p> <p>2 A. Yes, I do.</p> <p>3 Q. And are we in a position where</p> <p>4 we can pull up the database and put it on the</p> <p>5 screen share?</p> <p>6 A. I would be happy to.</p> <p>7 Q. Because what you -- what</p> <p>8 Mr. Murdica had in front of you were printout</p> <p>9 of screenshots, right?</p> <p>10 A. That's correct.</p> <p>11 Q. But this is the actual live</p> <p>12 database, right?</p> <p>13 A. Yes, it is.</p> <p>14 Q. And if we go over to home --</p> <p>15 oh, sorry. If you go over to CT -- yeah, go</p> <p>16 to about us. There you go.</p> <p>17 I want you to explain to the</p> <p>18 judge and the jury what is the CTD, the</p> <p>19 comparative toxicogenomic's database?</p> <p>20 A. So as described in the</p> <p>21 overview, that "CTD is a robust, publicly</p> <p>22 available database that aims to advance</p> <p>23 understanding about how environmental</p> <p>24 exposures affect human health. It provides</p> <p>25 manually curated information about</p>	<p style="text-align: right;">Page 393</p> <p>1 Do you know what that means?</p> <p>2 A. Yes, I do.</p> <p>3 Q. What does that mean?</p> <p>4 A. So the exposome is the idea</p> <p>5 that similar to a lot of the other OMIC data,</p> <p>6 in the environment we're exposed to a lot of</p> <p>7 different compounds that can influence,</p> <p>8 what's referred here, as chemical and</p> <p>9 phenotype relationships. And the idea is</p> <p>10 that these models can be used to help drive</p> <p>11 research looking at potential biomarkers that</p> <p>12 may be indicative of particular exposures.</p> <p>13 Q. Okay. And then it says, the</p> <p>14 next sentence says, "The initial release of</p> <p>15 the CTD was November 12, 2004."</p> <p>16 And then under Support, it</p> <p>17 says, "This program is supported by funds</p> <p>18 from the National Institutes of Environmental</p> <p>19 Health Sciences."</p> <p>20 Do you know what that is?</p> <p>21 A. Yes, I do.</p> <p>22 Q. What is that?</p> <p>23 A. That's an institute under the</p> <p>24 National Institutes of Health that</p> <p>25 specifically focuses on the effects of</p>

<p style="text-align: right;">Page 394</p> <p>1 environments on health.</p> <p>2 Q. Okay. So this database is</p> <p>3 supported by the federal government.</p> <p>4 MR. MURDICA: Objection to the</p> <p>5 form.</p> <p>6 THE WITNESS: The NIH and the</p> <p>7 NIEHS are part of the federal</p> <p>8 government.</p> <p>9 QUESTIONS BY MR. TRACEY:</p> <p>10 Q. And the NIH is who you told us</p> <p>11 a few minutes ago gave you the grants.</p> <p>12 A. They do fund my research, yes.</p> <p>13 Q. Yeah.</p> <p>14 And then they go on to say,</p> <p>15 "We're also proud to be part of the NIEHS</p> <p>16 Environmental Health Science Center at</p> <p>17 NC State, the Center for Human Health and the</p> <p>18 Environment."</p> <p>19 And are you familiar with that</p> <p>20 organization at NC State?</p> <p>21 A. I haven't been there, but</p> <p>22 apparently they have a program project there</p> <p>23 that's funding their center, similar to what</p> <p>24 we have at Baylor.</p> <p>25 Q. Okay. And then just quickly</p>	<p style="text-align: right;">Page 396</p> <p>1 just the presentation that we see is the</p> <p>2 phenotype.</p> <p>3 Q. Okay. Now, if we scroll back</p> <p>4 up, and we want to do what you did in your</p> <p>5 report -- for example, if you go over and</p> <p>6 you -- under Search, can you click on Search?</p> <p>7 A. Well, this is what I would do.</p> <p>8 I would put chemicals --</p> <p>9 Q. Okay.</p> <p>10 A. -- here, and I can type in --</p> <p>11 Q. But I want you to start with</p> <p>12 Disease.</p> <p>13 A. Oh, I can do diseases as well.</p> <p>14 And I can --</p> <p>15 Q. And type in "autism spectrum</p> <p>16 disorder," and I want you to tell us what</p> <p>17 shows up and why it's important.</p> <p>18 A. So it defines autism spectrum</p> <p>19 disorder as a continuum of associated</p> <p>20 cognitive and neurobehavioral disorders,</p> <p>21 including, but not limited to, three</p> <p>22 core-defining features, impairments of</p> <p>23 socialization, impairments of verbal and</p> <p>24 nonverbal communication, and restricted and</p> <p>25 repetitive patterns of behavior, according to</p>
<p style="text-align: right;">Page 395</p> <p>1 scroll down, they've got data categories,</p> <p>2 because we're going to look at some of these.</p> <p>3 Mr. Murdica had the printouts, and we're</p> <p>4 going to look at the realtime search.</p> <p>5 They say the data categories</p> <p>6 they have are chemicals, diseases, genes,</p> <p>7 phenotypes and chemical-gene/protein</p> <p>8 interactions.</p> <p>9 Is there any more?</p> <p>10 If we scroll down, is there</p> <p>11 more?</p> <p>12 A. Well, the last one would be</p> <p>13 anatomy they have here for their references.</p> <p>14 It's also in the figure.</p> <p>15 Q. Okay. And you mentioned</p> <p>16 phenotypes, and I think y'all talked about it</p> <p>17 today, but nobody defined it.</p> <p>18 What's a phenotype?</p> <p>19 A. So the genotype-phenotype</p> <p>20 relationship would be best characterized by</p> <p>21 Mendelian genetics where the phenotype of a</p> <p>22 plant can be shorter or tall in regards to</p> <p>23 the genes are the genotype that control</p> <p>24 whether the plant was short or tall, and</p> <p>25 short or tall is the phenotype. So that's</p>	<p style="text-align: right;">Page 397</p> <p>1 the DSM-5.</p> <p>2 Q. And then it's got a bunch of</p> <p>3 tabs up there, and you can click on these and</p> <p>4 get information; is that right?</p> <p>5 A. That is correct.</p> <p>6 Q. And so if you click on</p> <p>7 "chemicals" -- let's do that, and tell us</p> <p>8 what shows up.</p> <p>9 A. So the top hit is valproic acid</p> <p>10 followed by acetaminophen.</p> <p>11 Q. Okay. And valproic acid, you</p> <p>12 and Mr. Murdica talked about, didn't you?</p> <p>13 A. Yes, we have.</p> <p>14 Q. You -- I thought I heard you</p> <p>15 say, that's actually the model for causing</p> <p>16 autism.</p> <p>17 A. That is correct.</p> <p>18 Q. And so on this Comparative</p> <p>19 Toxicogenomics Database, when you type in the</p> <p>20 disease autism, does it mean that the number</p> <p>21 one chemical interaction is valproic acid?</p> <p>22 MR. MURDICA: Objection to</p> <p>23 form.</p> <p>24 THE WITNESS: Based on the</p> <p>25 direct evidence of mechanistic</p>

Page 398

1 interactions, valproic acid is the
2 number one chemical.
3 QUESTIONS BY MR. TRACEY:
4 Q. And is there a general -- is it
5 generally accepted in the medical and
6 scientific community, or the teratology
7 community, that valproic acid causes autism
8 spectrum disorder?
9 A. Yes.
10 Q. Have you yourself proven that
11 in your lab?
12 A. We've tested that in animal
13 model, yes.
14 Q. Okay. Number two on the list
15 is acetaminophen.
16 A. That's correct.
17 Q. And we're going to come back to
18 that.
19 Number three is Bisphenol A.
20 What is that?
21 A. That's a monitor -- monomer
22 that used to be used in the production of
23 plastics.
24 Q. And was that removed from
25 plastics?

Page 399

1 A. It was banned.
2 Q. It was banned by who?
3 A. The federal government.
4 Q. Okay. Is that known and
5 generally understood to be associated with
6 autism spectrum disorder?
7 A. There were concerns that it
8 could potentially increase risk for endocrine
9 disruption and autism spectrum disorder.
10 Q. Okay. 6 and 7, I'm just going
11 to get you to highlight because you talked
12 about them with Mr. Murdica in terms of
13 confounding.
14 And that's air pollutants in
15 particular -- particulate matter, right?
16 A. That's correct.
17 Q. And is there some evidence that
18 air pollutants and particulate matter may
19 contribute to cause autism?
20 A. Yes, there is.
21 Q. Okay. Folic acid is number 9.
22 I know you know a lot about folic acid,
23 right?
24 A. Yes, I do.
25 Q. What is folic acid?

Page 400

1 A. Folic acid is a provitamin in
2 the production of vitamin B9, which are a
3 family of folates, which are considered
4 essential vitamins.
5 Q. And does folic acid cause
6 autism?
7 A. It does not. Its indication
8 there is that use of folic acid has been
9 shown to reduce the risk of autism.
10 Q. And Rick Finnell was one of the
11 pioneers in that research, wasn't he?
12 MR. MURDICA: Objection to
13 form.
14 THE WITNESS: So we have done
15 some work in regards to the neural
16 tube defect decreased risk and autism
17 as well in regards to interaction with
18 folate.
19 QUESTIONS BY MR. TRACEY:
20 Q. And do you know, Dr. Cabrera,
21 whether it is recommended for all pregnant
22 mothers in the United States to take folic
23 acid to, in part, reduce the risk of autism?
24 A. Originally folic acid was used
25 to fortify the food supply in order to reduce

Page 401

1 the risk of neural tube defects.
2 More recently, it's been shown
3 to reduce the risk of autism as well.
4 Q. Okay. So some of the things on
5 this list of the top ten, let's say, are
6 associated with autism in a negative way in
7 the sense that they cause it, and some are
8 associated with it in a positive way in that
9 they help reduce it; is that right?
10 MR. MURDICA: Object to form.
11 Sean, if you're going to keep
12 making misrepresentations and lead
13 like this, you just got to stop.
14 You're testifying.
15 MR. TRACEY: Well,
16 Dr. Cabrera --
17 MR. MURDICA: You got to stop,
18 Sean.
19 QUESTIONS BY MR. TRACEY:
20 Q. Dr. Cabrera, tell us what it
21 means when I see valproic acid,
22 acetaminophen, bisphenol A, et cetera, on
23 this -- on this chart from the toxicogenomic
24 databases, why is this important to you in
25 your opinion?

Page 402

1 A. Well, there's --

2 MR. MURDICA: Objection to

3 form.

4 THE WITNESS: -- two parts.

5 One in that it's showing that there's,

6 what we refer to, as direct evidence

7 for an interaction between valproic

8 acid and the disease.

9 And that's indicated here when

10 you highlight over this -- M is for

11 mechanistic interactions.

12 And then also, it will identify

13 genes that have been previously

14 associated or been shown to cause or

15 increase the risk of autism that have

16 also been shown to be influenced by

17 exposure to either valproic acid or

18 acetaminophen.

19 QUESTIONS BY MR. TRACEY:

20 Q. And do you see -- can you go

21 back to that? There you go.

22 So that score, valproic acid

23 and autism has a score of 264.59, right?

24 A. That's correct.

25 Q. And there are 50 references

Page 403

1 there to the right, and there's 311 genes

2 there under the Inference Network, right?

3 A. That is correct.

4 Q. And there is no question in the

5 medical and scientific community that

6 valproic acid causes autism, is there?

7 MR. MURDICA: Object to the

8 form.

9 Sean, you can't testify. I

10 mean, that's not the way this works.

11 QUESTIONS BY MR. TRACEY:

12 Q. Can you answer my question,

13 Dr. Cabrera?

14 A. There was no question.

15 Q. Okay. Now, when you were --

16 when Mr. Murdica was showing you the 35 and

17 the references and he clicked on that and he

18 did a little -- when we look at these

19 studies, we don't see any mention of

20 acetaminophen or Tylenol.

21 Do you remember that?

22 A. Yes, I do.

23 Q. And you told him later on he

24 wasn't doing it right.

25 Do you remember that?

Page 404

1 A. Yes.

2 Q. And so I want you to show the

3 judge and the jury how to do this right so

4 they can understand your testimony.

5 MR. MURDICA: Objection to

6 form. That's not a question.

7 MR. TRACEY: It is.

8 QUESTIONS BY MR. TRACEY:

9 Q. Can you show us how to do this

10 right, Dr. Cabrera, so that we can see how

11 this database funded by the federal

12 government shows that acetaminophen interacts

13 with genes and is associated with autism?

14 A. Yes, I can.

15 And so as an example here, if

16 you click on the genes that are indicated in

17 the network, those genes come up. They're

18 part of a gene list where if you look at a

19 database, or actually even within this

20 database, there are genes that have been

21 associated with or been shown to cause

22 autism.

23 And if you click on an

24 individual gene, as an example, it will then

25 show you the references that support those

Page 405

1 interactions.

2 And so I'll use an example here

3 of clicking on COMT, one of the ones that we

4 mentioned, or clicking on capicua, CIC, where

5 they ask where it was in the database. If

6 you click on that, it then opens up the

7 reference that indicates "acetaminophen

8 affects the expression of capicua messenger

9 RNA," and it provides you with a reference.

10 And if you click on that

11 reference, it will then provide you the study

12 that shows that acetaminophen was used in

13 hepatotoxicity, as I indicated in my report,

14 and shows the change in expression for

15 capicua.

16 And that can be done with any

17 of the genes in that -- in the gene family.

18 So it could also be done with COMT as I'd

19 also mentioned, and you'll get changes in

20 COMT as well. And you can do that with any

21 of the genes in the list.

22 That's where the references

23 are.

24 Q. Is it true, Doctor, and we can

25 do some more if we need to, but if I -- you

Page 406

1 click on any one of those genes --
 2 And that's what those are,
 3 genes, right?
 4 A. That's correct.
 5 Q. -- there is studies in this
 6 federally supported database that link the
 7 exposure to acetaminophen to either the
 8 downregulation or the upregulation of the
 9 expression of these genes?
 10 MR. MURDICA: Objection to
 11 form.
 12 QUESTIONS BY MR. TRACEY:
 13 Q. Is that right?
 14 A. There are studies for each one
 15 of those genes. They'll be supported --
 16 there will be studies that support that
 17 acetaminophen changes their expression. And
 18 you can also filter that if you want to look
 19 particularly at upregulation, or increase in
 20 expression, or downregulation, or decrease
 21 expression.
 22 Q. Okay. And the score there for
 23 acetaminophen and autism is 231, and the
 24 score for valproic acid is 264.
 25 A. That is correct.

Page 407

1 MR. MURDICA: Objection --
 2 QUESTIONS BY MR. TRACEY:
 3 Q. Is that right?
 4 MR. MURDICA: Objection to
 5 form.
 6 QUESTIONS BY MR. TRACEY:
 7 Q. The inference score.
 8 Is that right?
 9 A. That is correct.
 10 Q. And in terms -- what is an
 11 "inference score"?
 12 A. So --
 13 MR. MURDICA: Objection to
 14 form.
 15 THE WITNESS: So as indicated,
 16 that's querying the database. It
 17 shows you the strength of this
 18 interaction.
 19 QUESTIONS BY MR. TRACEY:
 20 Q. And so number 1, the highest
 21 inference score is valproic acid. Number 2
 22 is acetaminophen.
 23 MR. MURDICA: There's no
 24 question. Objection to form.
 25

Page 408

1 QUESTIONS BY MR. TRACEY:
 2 Q. Is that right?
 3 A. That is correct.
 4 Q. It is a question.
 5 A. And there's two parts of this.
 6 So partially sorted by direct
 7 evidence and then by the inference score,
 8 those are highest reported interactions.
 9 Q. Okay. Let's do something.
 10 Does anybody in the world that you know of
 11 think that ibuprofen causes autism?
 12 A. Not that I'm aware.
 13 Q. Let's do something just for
 14 fun. Let's go back and type in "ibuprofen"
 15 and see if autism comes up.
 16 A. You want to look at diseases?
 17 Q. Diseases, yeah.
 18 Do you see any autism there?
 19 A. I do not see that as a -- at
 20 least as a top hit, and the inferences scores
 21 are rather low.
 22 Q. And then if you go to
 23 hypertension, that's number one for
 24 ibuprofen?
 25 A. That is correct.

Page 409

1 Q. Do you know whether or not
 2 ibuprofen is associated with hypertension?
 3 A. It is associated with
 4 hypertension. It's one of the reasons why
 5 it's contraindicated in late pregnancy.
 6 Q. Okay. Okay.
 7 Now, how did you use this
 8 database, if you did, to support your
 9 opinion?
 10 A. I used it to -- actually, and
 11 largely in response to criticism that was
 12 brought up by Dr. Chung in regards to having
 13 no gene or gene-drug interactions identified
 14 in the literature.
 15 Q. Okay. And this is the proof
 16 that that's false.
 17 MR. MURDICA: Objection to
 18 form.
 19 THE WITNESS: So --
 20 QUESTIONS BY MR. TRACEY:
 21 Q. Is that right?
 22 A. As indicated in my report, this
 23 data does report that there are overlapping
 24 etiology in regards to genes between ADHD and
 25 ASD, and I reported that in my report.

Page 410

1 Q. Can you go back to the main
2 page again, just for a second, then we're
3 going to leave this.
4 Do you know -- do you know if
5 Johnson & Johnson has anything to do with
6 this database?
7 A. I --
8 MR. MURDICA: Objection.
9 THE WITNESS: Not that I'm
10 aware.
11 QUESTIONS BY MR. TRACEY:
12 Q. Okay. Do you know if Johnson &
13 Johnson gives any money to support this
14 database?
15 A. Not that I'm aware.
16 Q. All right. Anything else we
17 need to talk about on this database for now?
18 A. I think we've covered the
19 deficiencies that I've noticed earlier.
20 Q. Okay. I want to flip and talk
21 about this adverse outcome pathway for a
22 second.
23 If somebody could bring up
24 adverse outcome pathway 20 so we can put it
25 on the screen like we did this database.

Page 411

1 By the way, you did -- you told
2 Mr. Murdica what you did was a weight of the
3 evidence analysis, correct?
4 A. That is correct.
5 Q. And weight of the evidence
6 analysis means -- does it -- does it mean you
7 weighed all the different lines of evidence?
8 A. That is correct.
9 Q. And is there any one piece in
10 your weight of the evidence analysis that if
11 it, you know, wasn't there, your opinion
12 would crumble to dust?
13 MR. MURDICA: Objection to
14 form.
15 THE WITNESS: Any one piece.
16 If there were deficiencies at multiple
17 steps, then you would be -- you would
18 have trouble drawing conclusions.
19 QUESTIONS BY MR. TRACEY:
20 Q. Well, let me ask it this way.
21 If the toxicogenomic database
22 didn't exist, would you still have the same
23 opinion?
24 A. I could still draw -- I could
25 still make the opinions in the absence of the

Page 412

1 database.
2 Q. Okay. And if the adverse
3 outcome pathway that's been published as
4 number 20 didn't exist, would you still have
5 the same opinions?
6 A. Yes, and I would still go
7 through the same analysis, even in the
8 absence of adverse outcome pathway number 20.
9 Q. What I want to do just for fun
10 is, can you search this pathway for the word
11 "autism"?
12 A. Yes, I can.
13 Q. Hold on. Before you do that,
14 before you hit -- oh, sorry. I was going to
15 read the actual title of the pathway.
16 It's called "The binding of
17 electrophilic chemicals to the SH thiol group
18 of proteins and/or to selenoproteins involved
19 in protection against oxidative stress during
20 brain development leading to impairment of
21 learning and memory."
22 Did I read that right?
23 A. That's correct.
24 Q. And then over to the right are
25 a bunch of authors, right?

Page 413

1 A. That is correct.
2 Q. Do you know if any of them work
3 for Johnson & Johnson?
4 A. I do not know that any of them
5 work for Johnson & Johnson.
6 Q. Okay. Go back and search for
7 "autism." I want to see whether it comes up
8 in this document.
9 A. So it indicates there's 15
10 mentions of autism within the document.
11 Q. Okay. Can we -- let's just
12 look at a couple. I don't know if you can
13 make that bigger. I'm blind, and I have some
14 my glasses on.
15 A. That good?
16 Q. So there's a reference that
17 says, "The relationship between mercury and
18 autism, a comprehensive review and
19 discussion." And that's referenced in this
20 paper?
21 A. That is correct.
22 Q. And then down below, it's got
23 "Landa, diagnosis of autism spectrum
24 disorders in the first three years of life."
25 That's another one?

Page 414

1 A. Yes.

2 Q. Let's go to the next one. "The

3 role of epigenetic change in autism spectrum

4 disorders," and that's in the Frontiers of

5 Neurology, there at the top page 23? "The

6 role of epigenetic change in autism

7 spectrum" -- oh.

8 A. I -- yes.

9 Q. It's a stream site, isn't it?

10 Yeah.

11 A. Yes, it is.

12 Q. Okay. Do you know whether or

13 not epigenetic change has been associated

14 with autism?

15 MR. MURDICA: Objection to

16 form.

17 THE WITNESS: Yes, I do know it

18 has been associated.

19 QUESTIONS BY MR. TRACEY:

20 Q. Okay. In your lab, do you

21 spend a great deal of your time studying and

22 researching epigenetic changes?

23 MR. MURDICA: Objection to

24 form.

25 THE WITNESS: Yes, we do. We

Page 415

1 recently published an epigenetic study

2 looking at the interaction of folate

3 or folic acid specifically on

4 epigenetic changes in the animal model

5 or mice.

6 QUESTIONS BY MR. TRACEY:

7 Q. Okay. Keep clicking. Let's

8 see what else comes up in this adverse

9 outcome pathway on autism.

10 Okay. "The putative role of

11 environmental mercury and the pathogenesis

12 and pathophysiology of autism spectrum

13 disorders and subtypes."

14 What's next? There we go.

15 Is this in the body of the AOP

16 here?

17 MR. MURDICA: Objection to

18 form.

19 QUESTIONS BY MR. TRACEY:

20 Q. Can we tell?

21 A. This is page 47 of the AOP.

22 Q. And they mention there in the

23 middle, "Indeed, disruption of glutamate,

24 signalling is thought to be part of the

25 etiology underlying some neurodevelopmental

Page 416

1 disorders such as autism and schizophrenia."

2 Do you agree with that?

3 A. I -- yes, that has been

4 reported.

5 Q. Okay. Same -- next paragraph,

6 they mention autism again saying, "Genes

7 involved in gluta -- glutamatergic pathways

8 affecting receptor signalling metabolism and

9 transport were enriched in genetic variants

10 associated with autism spectrum disorder."

11 Is that right?

12 A. Yes, it is.

13 Q. What does that mean?

14 A. Simply that if you looked at

15 those genes that have been associated with

16 autism spectrum disorder, and that is, genes

17 that have been known to modify or increase

18 risk for autism, that they also overlap

19 functionally and mechanistically with

20 glutaminergic pathways.

21 Q. Just click on another one.

22 Just go to one more through there.

23 There we got another paper.

24 That may be the same guy.

25 A. Yeah. I think this is the

Page 417

1 reference that they were referencing in those

2 studies.

3 Q. Yeah. Okay. Click one more in

4 that.

5 "Autism and intellectual

6 disability: Two sides of the same coin."

7 That's referenced in this paper, isn't it?

8 A. Yes, it is.

9 Q. Now, the name of this adverse

10 outcome pathway though isn't autism; they're

11 talking about memory and learning, right?

12 A. That is correct.

13 Q. Do you know why autism is

14 referenced so many times in this adverse

15 outcome pathway that's been published and

16 publicly available?

17 MR. MURDICA: Object. Object

18 to the form.

19 THE WITNESS: Because there's

20 overlap in the outcome with particular

21 exposures and their impact on

22 neurodevelopment that can lead to both

23 intellectual disability, autism and

24 other neurodevelopmental disorders,

25 including ADHD.

<p style="text-align: right;">Page 418</p> <p>1 QUESTIONS BY MR. TRACEY:</p> <p>2 Q. And do you use adverse outcome</p> <p>3 pathways in your -- in your -- during your --</p> <p>4 in your day job?</p> <p>5 A. I find them helpful, and the</p> <p>6 answer is yes. I find them helpful for</p> <p>7 identifying where there's deficiencies in</p> <p>8 research so that we can develop hypotheses</p> <p>9 and obtain funding to test those hypotheses.</p> <p>10 Q. And do you teach that to</p> <p>11 students?</p> <p>12 A. I do teach it to my students,</p> <p>13 yes.</p> <p>14 Q. Okay. The toxicogenomic</p> <p>15 database that we were on a few minutes ago</p> <p>16 supported by the federal government, do you</p> <p>17 use that database in your day job?</p> <p>18 A. Occasionally. When I have to</p> <p>19 look up data on a -- on a chemical that I'm</p> <p>20 researching, I'll often start with the</p> <p>21 database searches as it's normal to start</p> <p>22 with what's known in the databases, both the</p> <p>23 chemistry databases and the genetics and</p> <p>24 genomics databases.</p> <p>25 Q. Do you remember when</p>	<p style="text-align: right;">Page 420</p> <p>1 scientific journal, then it's -- it will be</p> <p>2 sent out by multiple reviewers, and that's</p> <p>3 part of what we refer to as the peer review</p> <p>4 process.</p> <p>5 We find reviewers for a paper</p> <p>6 based on common publications of those</p> <p>7 reviewers with the topic of the publication,</p> <p>8 and then they review it and criticize it or</p> <p>9 find deficiencies in it.</p> <p>10 And that gets returned back to</p> <p>11 the author to correct or to respond to those</p> <p>12 criticisms in order to have the paper meet an</p> <p>13 expected scientific standard.</p> <p>14 Q. Okay. And have you yourself</p> <p>15 been a peer reviewer?</p> <p>16 A. I've acted as both peer</p> <p>17 reviewer and editor for various journals.</p> <p>18 Q. And on the topic of birth</p> <p>19 defects or adverse birth outcomes?</p> <p>20 A. Yes. I've been guest editor</p> <p>21 for Birth Defects Research, and I'm currently</p> <p>22 acting as a guest editor for Reproductive</p> <p>23 Toxicology.</p> <p>24 Q. And so you -- you've done</p> <p>25 what -- you've been the peer reviewer where</p>
<p style="text-align: right;">Page 419</p> <p>1 Mr. Mordica was clicking on 35 and bringing</p> <p>2 up those papers and said none of them said</p> <p>3 acetaminophen?</p> <p>4 Do you remember that?</p> <p>5 A. Yes, I do.</p> <p>6 Q. How come he couldn't find</p> <p>7 acetaminophen?</p> <p>8 A. Well, that study that's -- we</p> <p>9 were -- that I would reference in regard to</p> <p>10 Santos was a methodology. It's describing</p> <p>11 the method I was using.</p> <p>12 It wasn't describing the</p> <p>13 genetic analysis that I did, which you have</p> <p>14 to click on the genes in order to look at the</p> <p>15 genetic analysis.</p> <p>16 Q. So he was just in the wrong</p> <p>17 place?</p> <p>18 A. That is correct.</p> <p>19 Q. Okay. Do you -- Dr. Cabrera,</p> <p>20 you're familiar with the peer review process?</p> <p>21 A. Yes, I am.</p> <p>22 Q. What is the peer review</p> <p>23 process?</p> <p>24 A. If you want to publish a paper</p> <p>25 that is going to be in a reputable,</p>	<p style="text-align: right;">Page 421</p> <p>1 you looked at somebody else's scientific</p> <p>2 work; you made edits; you made comments; you</p> <p>3 asked questions, right?</p> <p>4 A. I still do that as well, yes.</p> <p>5 Q. And you yourself -- you've had</p> <p>6 your homework graded when you've submitted it</p> <p>7 to peer review by other experts in the field,</p> <p>8 haven't you?</p> <p>9 A. Yes, I have.</p> <p>10 Q. And all that is part of the</p> <p>11 scientific process that is so important to</p> <p>12 worldwide scientific knowledge, isn't it?</p> <p>13 MR. MURDICA: Objection to</p> <p>14 form.</p> <p>15 You're doing it again, Sean.</p> <p>16 See if you can ask a non-leading</p> <p>17 question. You're obligated to.</p> <p>18 MR. TRACEY: Okay. I'm trying</p> <p>19 to move us out of here quickly, but,</p> <p>20 Robert --</p> <p>21 MR. MURDICA: Doesn't --</p> <p>22 doesn't feel that way.</p> <p>23 QUESTIONS BY MR. TRACEY:</p> <p>24 Q. Tell us why the peer review</p> <p>25 process is important.</p>

Page 422

1 A. It's important that the
 2 research meets a standard and that people
 3 that are proficient in the field can
 4 understand it and potentially reproduce it.
 5 In order for -- to provide that
 6 information, it needs to be reviewed by
 7 others to meet that standard.
 8 Q. Okay. And you participate and
 9 support the peer review process; is that
 10 right?
 11 A. Yes, I do.
 12 Q. Mr. Murdica showed you a
 13 document, I think it might be Exhibit 17, but
 14 was that a peer review of AOP 20?
 15 A. Yes, that has been
 16 peer-reviewed as well.
 17 Q. Okay. Anything in that peer
 18 review that you read on your break that
 19 alters one word of your opinion?
 20 MR. MURDICA: Objection to
 21 form.
 22 THE WITNESS: No, there's not.
 23 QUESTIONS BY MR. TRACEY:
 24 Q. Okay. That looked like a
 25 typical peer review process?

Page 423

1 A. Well, they -- some of them can
 2 be pretty intense, so I would say it was --
 3 it was a -- maybe an average -- yeah, an
 4 average peer review process.
 5 Q. Okay. All right. All of your
 6 opinions that you've given and gave in your
 7 report are based on reasonable scientific
 8 certainty?
 9 A. Yes. All the opinions I've
 10 given have been provided within a reasonable
 11 degree of scientific certainty.
 12 Q. Tell me what percentage of your
 13 adult life you've been engaged in trying to
 14 find out the cause of and ways to prevent
 15 birth defects.
 16 A. Actually, all of my adult life
 17 I've been working either in genetics or birth
 18 defects research.
 19 Q. Your entire professional life?
 20 A. Yeah, starting as an
 21 undergraduate and continuing on thereafter.
 22 MR. TRACEY: And -- okay. All
 23 right. Dr. Cabrera, I'll save the
 24 rest for later. Thank you.
 25 I'll pass the witness.

Page 424

1 REDIRECT EXAMINATION
 2 QUESTIONS BY MR. MURDICA:
 3 Q. Dr. Cabrera, do you stand by
 4 the answers that you gave me under oath so
 5 far today?
 6 A. I do.
 7 Q. Okay. Mr. Tracey started
 8 asking you questions, several of them, about
 9 Rick Finnell and Rick Finnell's
 10 qualifications and lab you share with Rick
 11 Finnell.
 12 Do you remember those?
 13 A. Yes.
 14 Q. You also know, Dr. Cabrera,
 15 that Rick Finnell has taken a lot of money
 16 from Sean Tracey and other plaintiffs'
 17 lawyers involved in this litigation, right?
 18 MS. KING: Objection, form.
 19 MR. TRACEY: Object to the
 20 form.
 21 THE WITNESS: I don't -- I
 22 don't know how much money he's
 23 received.
 24 QUESTIONS BY MR. MURDICA:
 25 Q. You know that Mr. Tracey has

Page 425

1 hired him for other birth defect litigation,
 2 right?
 3 MR. TRACEY: Object to the
 4 form.
 5 THE WITNESS: I -- I'm aware.
 6 QUESTIONS BY MR. MURDICA:
 7 Q. You're aware. You've testified
 8 under oath about it before, right?
 9 A. I'm aware.
 10 Q. Okay. And it goes, you got
 11 into this business of taking money from
 12 plaintiffs' lawyers from Dr. Finnell who
 13 originally was the one taking money from
 14 plaintiffs' lawyers, right?
 15 MS. KING: Objection. Form.
 16 QUESTIONS BY MR. MURDICA:
 17 Q. He got you into it?
 18 A. To be clear, Richard Finnell
 19 has worked with both the defense and
 20 plaintiffs in the past and has been --
 21 because I recall he's been retained in the
 22 past also by defense.
 23 Particularly I think he was
 24 actually on a panel for Johnson & Johnson in
 25 the past.

Page 426

1 Q. You testified under oath before
2 that he did one case for one defendant for a
3 short amount of time.
4 Do you remember testifying to
5 that in 2018?
6 A. As I just indicated.
7 Q. Okay. And you know that
8 Dr. Finnell has worked for plaintiffs'
9 lawyers on birth defect cases. By and large
10 that's been his expert involvement in
11 litigation, right?
12 A. He has done that, yes.
13 Q. And that's how you got
14 introduced to this, right?
15 A. We used to have a company
16 together.
17 Q. Okay. When you brought up the
18 database onto the computer screen, one of the
19 things Mr. Tracey had you read was the
20 base -- the background on the database, and
21 it said -- well, you read into the record
22 that it was intended to aid with the
23 development of hypotheses.
24 Correct?
25 A. That's correct.

Page 427

1 Q. And that's what you used it
2 for, right?
3 A. Initially, as I just told you,
4 I looked at that database in order to see if
5 there -- if and how many genes there were
6 that were common to the etiology of ADHD and
7 ASD.
8 Q. Right.
9 And what the database says --
10 there's a disclaimer that I'm sure you've
11 seen that says, this should not be used to
12 diagnose any condition or disease, right?
13 A. That is correct. It's not for
14 diagnosis.
15 Q. Right.
16 And the fact that there's a
17 number of genes allegedly connected to a
18 particular compound and an outcome doesn't
19 mean that it's causative, correct?
20 A. That in and of itself is not
21 enough evidence to conclude causality.
22 Q. And the example he showed you,
23 you clicked on CIC. That was the first gene
24 you clicked on, right?
25 A. As indicated earlier, I -- the

Page 428

1 question had come up about where was CIC in
2 the database, and so that was what I clicked
3 on to show you.
4 Q. And it gave the Beyer article,
5 which we previously marked as an exhibit,
6 right?
7 A. That's correct.
8 Q. And you weren't able to show
9 where CIC was in the article, correct?
10 A. I told you it was in the data.
11 Q. Right.
12 And we didn't see that on what
13 you just brought up on the -- on the computer
14 screen, correct?
15 A. We didn't -- we didn't dig
16 that deep into the data.
17 Q. That didn't fill in the gap of
18 what we were missing, right?
19 MS. KING: Objection. Form.
20 THE WITNESS: We didn't dig
21 that deep into the data.
22 QUESTIONS BY MR. MURDICA:
23 Q. Okay. If I leave a blank in
24 the transcript right here, will you fill in
25 when you -- when you get -- review and sign

Page 429

1 the transcript, will you fill in where that
2 mention is actually found in Beyer?
3 A. I can --
4 MS. KING: Objection. Form.
5 THE WITNESS: I can -- I can
6 look into it.
7 QUESTIONS BY MR. MURDICA:
8 Q. Thank you, Doctor.
9 If, when we get the transcript,
10 the blank that we're going to put is not
11 filled in, can we agree that it doesn't
12 exist, and it's not actually in that
13 citation?
14 MS. KING: Objection. Form.
15 THE WITNESS: We could agree
16 that I didn't find it.
17 QUESTIONS BY MR. MURDICA:
18 Q. Okay. Fair enough.
19 Mr. Tracey had you reading
20 from -- oh, by the way, if you were to click
21 on more of those genes, we would end up with
22 the other article marked that was responsible
23 for 217 of those 273, right, the one I showed
24 you earlier?
25 A. Potentially.

Page 430

1 Q. Right.

2 And that -- we never found --

3 in two of the articles I showed you, we never

4 found mention of the genes of the two that we

5 actually looked at, right?

6 A. In that particular article, we

7 did not see them.

8 Q. Right.

9 And that's responsible for the

10 majority of the alleged gene interactions

11 that Mr. Tracey had you click on, right?

12 A. I can certainly look into that.

13 Q. Okay. And if we were to open

14 others, I'm not going to make you do it right

15 now, but you tell me if you know this, I just

16 clicked on, on my own computer, FMO1, which

17 was one of those genes, and it lists a couple

18 different references. And one says that

19 acetaminophen upregulates FMO1 and then right

20 there, there is another reference that says

21 acetaminophen downregulates FMO1.

22 You've seen that, right?

23 A. There are examples where the

24 expression can change, depending on both

25 which tissues they're testing, which cell

Page 431

1 lines they're testing or the dosages they're

2 testing. You find differences in response.

3 Q. Yeah. There's -- you agreed

4 with me earlier that the criteria for

5 including a gene in that is just that some

6 article somewhere mentions it somehow as

7 associated in some way, right? There's a --

8 you could look at the listing of what words

9 they pick up on to determine whether to

10 include it, right?

11 A. It is a text-based query, and

12 you can then sort through that text base. So

13 if you want to look at just the genes that

14 are downregulated, you can find that, or just

15 the genes that are upregulated. You can also

16 look at protein interactions if you want to

17 look at mechanistic interactions as well.

18 Q. It's someone's attempt to put

19 all the data they can find together in one

20 place and let the viewer decide what to do

21 with it for hypothesis generation, correct?

22 A. Well, it's also the state of

23 the art right now for mining existing

24 scientific literature for information that

25 can be helpful for regulatory purposes.

Page 432

1 Q. Right.

2 And for identifying potential

3 gene compound outcome interactions, right?

4 A. It's used that -- for that as

5 well.

6 Q. Yeah.

7 It doesn't prove causation in

8 any given circumstance by itself, correct?

9 A. By itself, currently, it does

10 not --

11 Q. Okay.

12 A. -- demonstrate causation.

13 Q. Then Mr. Tracey showed you

14 AOP 20, and he had you read the instances

15 where the word "autism" appeared.

16 Do you remember that?

17 A. Yes, I do.

18 Q. Okay. And one of them he had

19 you read about, that autism shares pathways

20 with glute -- shares -- has commonality with

21 glutamatergic pathways.

22 Do you remember that?

23 A. Yes, I do.

24 Q. Okay. And that has nothing do

25 with this case. That's GABA, right?

Page 433

1 A. That is GABA.

2 Q. Yeah. And GABA is not one of

3 the mechanisms of action you've postulated in

4 any way to do with acetaminophen and the two

5 outcomes here, right?

6 A. I did not discuss GABA.

7 Q. And when you looked carefully

8 at what we're calling the peer review part of

9 AOP 20, you saw clearly that the reviewers

10 said, "Unless the authors want to change the

11 ad" -- "the adverse outcome to autism, then

12 they should delete it. The authors must

13 delete the sentence in the overall assessment

14 domain of applicability section where they

15 refer to autism. This is not an AOP for

16 autism, and if that's the intention, it must

17 be changed."

18 You saw that when you were

19 reviewing it, right?

20 MS. KING: Objection. Form.

21 THE WITNESS: I read that.

22 QUESTIONS BY MR. MURDICA:

23 Q. Yeah. You don't agree with

24 Mr. Tracey that this is about autism in any

25 way, shape or form, correct?

<p style="text-align: right;">Page 434</p> <p>1 MS. KING: Objection. Form.</p> <p>2 THE WITNESS: So to be clear,</p> <p>3 the AOP still has language in regard</p> <p>4 to interaction with autism and</p> <p>5 reference with autism as an endpoint.</p> <p>6 QUESTIONS BY MR. MURDICA:</p> <p>7 Q. It has -- it has the mentions</p> <p>8 like what you looked at with Mr. Tracey,</p> <p>9 right?</p> <p>10 A. In addition to what I've</p> <p>11 referenced in my report.</p> <p>12 Q. Right.</p> <p>13 What it -- what it doesn't say</p> <p>14 is that autism is an outcome as part of that</p> <p>15 AOP. And it's very clear, is it not, from</p> <p>16 the review, that that was not permitted to be</p> <p>17 part of it?</p> <p>18 MS. KING: Objection. Form.</p> <p>19 THE WITNESS: But -- I don't</p> <p>20 know about permission, but they ask</p> <p>21 that it's either -- the AOP itself be</p> <p>22 changed to autism-specific AOP, or</p> <p>23 that it be removed, and they chose to</p> <p>24 remove it.</p> <p>25</p>	<p style="text-align: right;">Page 436</p> <p>1 A. Yes, they do.</p> <p>2 Q. Do you know whether or not</p> <p>3 Baylor College of Medicine, because they</p> <p>4 receive money from Johnson & Johnson, forbid</p> <p>5 Rick Finnell from testifying in this case?</p> <p>6 A. That is correct.</p> <p>7 Q. What do you think of that?</p> <p>8 MR. MURDICA: Objection to</p> <p>9 form.</p> <p>10 THE WITNESS: Well, it's a</p> <p>11 little bit upsetting. A little bit</p> <p>12 disturbing.</p> <p>13 QUESTIONS BY MR. TRACEY:</p> <p>14 Q. That someone can throw their</p> <p>15 money around and stop scientists from</p> <p>16 testifying?</p> <p>17 MR. MURDICA: Hang on.</p> <p>18 Objection to form.</p> <p>19 THE WITNESS: That's correct.</p> <p>20 MR. MURDICA: Sean, you said</p> <p>21 that Baylor -- you're testifying,</p> <p>22 Sean, but you're testifying that</p> <p>23 Baylor is preventing Finnell, correct?</p> <p>24 MR. TRACEY: That's right.</p> <p>25 Because they receive money from</p>
<p style="text-align: right;">Page 435</p> <p>1 QUESTIONS BY MR. MURDICA:</p> <p>2 Q. Right.</p> <p>3 And the author acknowledged, in</p> <p>4 what we read before, that they couldn't</p> <p>5 change it to autism because there wasn't</p> <p>6 enough data to support it, correct?</p> <p>7 MS. KING: Objection. Form.</p> <p>8 THE WITNESS: That was, in</p> <p>9 part, what we read earlier.</p> <p>10 MR. MURDICA: Okay. I don't</p> <p>11 have any other questions.</p> <p>12 RECROSS-EXAMINATION</p> <p>13 QUESTIONS BY MR. TRACEY:</p> <p>14 Q. Dr. Cabrera, Mr. Murdica likes</p> <p>15 to talk a lot about money and plaintiffs'</p> <p>16 lawyers.</p> <p>17 Have you noticed that?</p> <p>18 A. I've heard it a few times.</p> <p>19 Q. Yeah. I want to talk about</p> <p>20 money and Johnson & Johnson for a minute.</p> <p>21 Okay?</p> <p>22 A. Okay.</p> <p>23 Q. Do you know whether or not</p> <p>24 Baylor College of Medicine receives money</p> <p>25 from Johnson & Johnson?</p>	<p style="text-align: right;">Page 437</p> <p>1 Johnson & Johnson, they are preventing</p> <p>2 him from testifying in this case.</p> <p>3 MR. MURDICA: Yeah. Okay. You</p> <p>4 don't -- you don't know that. That is</p> <p>5 improper. That is definitely not --</p> <p>6 MR. TRACEY: I do know it,</p> <p>7 because I've seen the letter.</p> <p>8 MR. MURDICA: Well, you're not</p> <p>9 under oath, and you're not giving</p> <p>10 witness testimony, so you need to</p> <p>11 stop.</p> <p>12 MR. TRACEY: Well, I know.</p> <p>13 That's why I'm asking Robert</p> <p>14 Cabrera --</p> <p>15 MR. MURDICA: You told him.</p> <p>16 MR. TRACEY: -- because he</p> <p>17 knows it, and I need to get the</p> <p>18 testimony from him.</p> <p>19 MR. MURDICA: I think you</p> <p>20 forgot how to ask a question,</p> <p>21 Mr. Tracey. But you need to stop.</p> <p>22 MR. TRACEY: I've forgot --</p> <p>23 I've forgotten so much, Jim, I don't</p> <p>24 know where to begin.</p> <p>25</p>

<p style="text-align: right;">Page 438</p> <p>1 QUESTIONS BY MR. TRACEY:</p> <p>2 Q. But let me ask you this.</p> <p>3 Dr. Cabrera, you know, sir,</p> <p>4 don't you, that Baylor College of Medicine</p> <p>5 refused to allow Rick Finnell to testify in</p> <p>6 this case because they receive money from</p> <p>7 Johnson & Johnson?</p> <p>8 MR. MURDICA: Objection to the</p> <p>9 form. I mean, that is literally --</p> <p>10 MR. TRACEY: Do you --</p> <p>11 MR. MURDICA: Can you ask a</p> <p>12 non-leading question?</p> <p>13 QUESTIONS BY MR. TRACEY:</p> <p>14 Q. Let me flip it around.</p> <p>15 Do you know whether or not</p> <p>16 Baylor College of Medicine forbid Rick</p> <p>17 Finnell from testifying in this case because</p> <p>18 they received money from Johnson & Johnson?</p> <p>19 MR. MURDICA: Objection to</p> <p>20 form.</p> <p>21 THE WITNESS: That is correct.</p> <p>22 QUESTIONS BY MR. TRACEY:</p> <p>23 Q. Okay.</p> <p>24 A. That was the reason they gave</p> <p>25 him that he could not testify.</p>	<p style="text-align: right;">Page 440</p> <p>1 FURTHER REDIRECT EXAMINATION</p> <p>2 QUESTIONS BY MR. MURDICA:</p> <p>3 Q. Dr. Cabrera, you testified</p> <p>4 earlier that Baylor doesn't even know the</p> <p>5 crazy opinions you're espousing here, right?</p> <p>6 You never told them?</p> <p>7 MS. KING: Objection. Form.</p> <p>8 QUESTIONS BY MR. MURDICA:</p> <p>9 Q. Do they know you're out here</p> <p>10 creating a health hazard?</p> <p>11 MS. KING: Objection. Form.</p> <p>12 QUESTIONS BY MR. MURDICA:</p> <p>13 Q. Dr. Cabrera, does Baylor know</p> <p>14 what you're doing?</p> <p>15 MS. KING: Objection. Form.</p> <p>16 MR. TRACEY: Don't answer those</p> <p>17 questions. Those are abusive and</p> <p>18 insulting and unbecoming.</p> <p>19 QUESTIONS BY MR. MURDICA:</p> <p>20 Q. Dr. Cabrera, does Baylor know</p> <p>21 what you're doing today and the opinions that</p> <p>22 you're offering?</p> <p>23 A. As I already indicated, I'm on</p> <p>24 vacation today.</p> <p>25 Q. Right.</p>
<p style="text-align: right;">Page 439</p> <p>1 Q. That was the reason they gave</p> <p>2 him.</p> <p>3 MR. MURDICA: Objection to</p> <p>4 form.</p> <p>5 MR. TRACEY: Sorry, I spoke</p> <p>6 over you.</p> <p>7 QUESTIONS BY MR. TRACEY:</p> <p>8 Q. I just want to make sure.</p> <p>9 Is that what you said?</p> <p>10 A. That is the reason they gave</p> <p>11 him; that he was -- that he would not be</p> <p>12 allowed to testify.</p> <p>13 MR. MURDICA: Objection to</p> <p>14 form.</p> <p>15 QUESTIONS BY MR. TRACEY:</p> <p>16 Q. Okay. Do you know whether he</p> <p>17 agrees with you?</p> <p>18 MR. MURDICA: Objection to</p> <p>19 form. This is not -- if you want</p> <p>20 Dr. Finnell, get Dr. Finnell. This is</p> <p>21 not about Dr. Finnell.</p> <p>22 THE WITNESS: He does agree</p> <p>23 with me.</p> <p>24 MR. TRACEY: All right. Thank</p> <p>25 you, Dr. Cabrera. Pass the witness.</p>	<p style="text-align: right;">Page 441</p> <p>1 Did you ask Baylor anything</p> <p>2 about Dr. Finnell and whether or not he could</p> <p>3 testify in this litigation?</p> <p>4 A. I didn't ask Baylor about</p> <p>5 what -- whether Dr. Finnell could, but he did</p> <p>6 disclose that information to me. And he told</p> <p>7 me that Baylor said that he would not be</p> <p>8 allowed to testify.</p> <p>9 Q. So Dr. Finnell told you</p> <p>10 something that he allegedly heard from</p> <p>11 Baylor, correct?</p> <p>12 MS. KING: Object to form.</p> <p>13 THE WITNESS: It's not that he</p> <p>14 allegedly heard. He had communication</p> <p>15 in that regard.</p> <p>16 QUESTIONS BY MR. MURDICA:</p> <p>17 Q. But you did not. You didn't</p> <p>18 hear it, did you? Did you see a</p> <p>19 communication?</p> <p>20 A. I have -- I have not seen a</p> <p>21 communication.</p> <p>22 Q. Okay. Did Dr. Finnell ask</p> <p>23 Baylor before deciding whether or not he</p> <p>24 could do that here?</p> <p>25 A. He asked before he could</p>

Page 442

1 testify.

2 Q. He asked, but you didn't,

3 right?

4 A. I -- my conflict of interest is

5 through my company. He was going to testify

6 as an individual employee of Baylor.

7 Q. So if he had a company, it

8 would be different?

9 A. As it used to be when we were

10 part of the same company, we consulted under

11 our company.

12 Q. Okay. So you were just asked

13 questions about something that you heard

14 third-hand from Dr. Finnell that he allegedly

15 asked Baylor about but you didn't, right?

16 MS. KING: Objection. Form.

17 THE WITNESS: I heard firsthand

18 from Dr. Finnell in that regard.

19 QUESTIONS BY MR. MURDICA:

20 Q. Right.

21 About something he allegedly

22 heard from Baylor itself, right?

23 A. About his communication with

24 Baylor.

25 Q. Okay.

Page 443

1 A. He told me that it wasn't that

2 I went out and asked him. He told me that --

3 about what was going on.

4 Q. So other people at Baylor, if

5 they don't have a company, have to ask Baylor

6 if they can testify as an expert, but you

7 don't, right?

8 A. Anybody that has a company and

9 files conflict of interests through their

10 company, I have it on my disclaimer and I'm

11 under a conflict of interest that I have to

12 disclose what I'm doing in my company, and I

13 have to identify whether it's creating a

14 conflict of interest with my funded research.

15 And if it does, then I'll have to disclose

16 that, and that's one of the reasons why I

17 mentioned earlier that I would not be able to

18 do acetaminophen work at Baylor College of

19 Medicine.

20 Q. And Baylor hasn't stopped you

21 in any way from testifying here or offering

22 your opinions, correct?

23 A. They have not.

24 MR. MURDICA: Okay. I have no

25 further questions.

Page 444

1 MR. TRACEY: Thanks,

2 Dr. Cabrera.

3 THE WITNESS: Thank you.

4 VIDEOGRAPHER: Okay. Off the

5 record. 6:38.

6 (Deposition concluded at 6:38 p.m.)

7 -----

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

Page 445

1 CERTIFICATE

2 I, CARRIE A. CAMPBELL, Registered

3 Diplomate Reporter, Certified Realtime

4 Reporter and Certified Shorthand Reporter, do

5 hereby certify that prior to the commencement

6 of the examination, Robert Cabrera, Ph.D.

7 was duly sworn by me to testify to the truth,

8 the whole truth and nothing but the truth.

9 I DO FURTHER CERTIFY that the

10 foregoing is a verbatim transcript of the

11 testimony as taken stenographically by and

12 before me at the time, place and on the date

13 hereinbefore set forth, to the best of my

14 ability.

15 I DO FURTHER CERTIFY that I am

16 neither a relative nor employee nor attorney

17 nor counsel of any of the parties to this

18 action, and that I am neither a relative nor

19 employee of such attorney or counsel, and

20 that I am not financially interested in the

21 action.

22

23

24

25

 CARRIE A. CAMPBELL,
 NCRA Registered Diplomate Reporter
 Certified Realtime Reporter
 California Certified Shorthand
 Reporter #13921
 Missouri Certified Court Reporter #859
 Illinois Certified Shorthand Reporter
 #084-004229
 Texas Certified Shorthand Reporter #9328
 Kansas Certified Court Reporter #1715
 New Jersey Certified Court Reporter
 #30X100242600
 Louisiana Certified Court Reporter
 #2021012
 Notary Public
 Dated: August 3, 2023

Page 446

INSTRUCTIONS TO WITNESS

Please read your deposition over carefully and make any necessary corrections. You should state the reason in the appropriate space on the errata sheet for any corrections that are made.

After doing so, please sign the errata sheet and date it. You are signing same subject to the changes you have noted on the errata sheet, which will be attached to your deposition.

It is imperative that you return the original errata sheet to the deposing attorney within thirty (30) days of receipt of the deposition transcript by you. If you fail to do so, the deposition transcript may be deemed to be accurate and may be used in court.

Page 448

ERRATA

PAGE	LINE	CHANGE
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		

Page 447

ACKNOWLEDGMENT OF DEPONENT

I, _____, do hereby certify that I have read the foregoing pages and that the same is a correct transcription of the answers given by me to the questions therein propounded, except for the corrections or changes in form or substance, if any, noted in the attached Errata Sheet.

Robert Cabrera, Ph.D. _____ DATE _____

Subscribed and sworn to before me this _____ day of _____, 20 ____.

My commission expires: _____

Notary Public

Page 449

LAWYER'S NOTES

PAGE	LINE
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	

<u>WORD</u> <u>INDEX</u>				
< \$ >	385:1	10019-9601	138 263:16,	21, 25
\$100,000	407:20	5:24	20 264:5	181 254:12
167:21	1,300 210:1,	10036 5:14	13921	184 230:24
	4 212:1, 19	10th 152:18	445:18	187 253:8
	1,430 289:14	11 9:15	14 9:21	19 10:11
	1,515 365:19	256:22, 25	19:13	369:17
	1.06 268:4	263:16	20:12	370:4, 17
< 0 >	270:22	373:6	22:25	1901 1:14
0.05 89:19	1.09 211:24	11:25	23:10 81:1	2:5
90:22 91:9	212:15	150:25	279:8, 12	191 363:9
0.43 289:16	1.27 383:11	151:1	338:20	19103 6:3
0.51 268:6	1.32 242:2	11:43 151:3	140 280:2	192 242:18,
0.87 289:16	1.33 242:4	11:59	147 347:20	19 243:1
0.92 241:3,	1.48 239:21	166:23, 24	348:4	1980s
21	241:8	111 8:18	149 9:5	155:12
0.99 383:12	1.55 243:17,	11758 2:24	15 10:1	1990s
00001 90:4	24	118 8:18	113:16	155:13
00966 3:7	1.56 211:22	331:1	119:6	1992 210:6
02 9:22	212:15	1185 5:13	179:13	1995 389:23
05 90:7	1.63 383:12	12 8:5	223:13	1st 349:13
053 243:17	1.7 289:17	9:15	298:21, 25	
07960 4:21	1.91 210:17	209:22	299:2	< 2 >
084-004229	211:16, 18	256:22	302:2, 7, 11,	2 1:6 8:3,
445:19	213:13	257:1	12 338:20	18 11:5
	1:22-md-	393:15	413:9	86:15
< 1 >	03043 1:6	12:48 167:1	150 2:16	111:21
1 8:13	1:22-md-	1200 4:16	158 337:18	112:8
64:3, 15, 16	03043-DLC	5:2	16 10:4	116:15, 22
88:5, 9, 10,	1:4	125 8:21	312:21, 22	133:21
15 89:5	10 9:11	126 2:23	314:15	134:1
90:14, 18, 24	150:6	127 9:1	315:18	137:25
211:19, 23	151:16	128 9:1	17 10:4	139:10
212:22, 23	222:6, 12	12-hour	331:22	149:12
230:23, 25	226:22	304:22	332:2	236:8
231:6	270:1	12th 4:16	337:17	250:11, 20
239:11, 22	330:15	5:2	338:15	251:3
243:25	10.6 233:24	13 9:18	422:13	270:1, 7, 8
270:8	10:01 86:11,	266:17, 20,	1700 5:18	303:3, 7
273:25	12	21 270:1	1715 445:20	304:17
295:2, 7, 15	10:22 86:14	13202 6:8	17th 6:2	316:15
316:9	100 138:19	133 9:3	18 10:8	381:9, 14
382:24	168:8	135 257:7	338:20	384:6
383:15	10019 5:8	1355 10:4	364:18, 20,	407:21
384:6, 19		136 263:10		2,644 210:2

2.02 267:21 270:4	412:4, 8 422:14	349:13, 22	219 129:7, 11, 19	284-3880 4:13
2.05 268:6	432:14	2017 351:6	22 338:21	287 214:3
2.1 246:5	433:9	426:5	339:13	289-1313
2.14 246:3	447:16	2019 116:7	222 9:11	4:17 5:3
2.24 211:24 212:15	20.6 231:22	259:24	23 339:13	29 270:3
2.25 243:21	200 16:21	202 4:17	414:5	274:2
2.26 246:1	124:17	5:3, 19	231 406:23	298 10:1
2.29 243:23	125:10	2020 151:24	24 10:6	
2.39 241:20	137:1	153:8	24-hour	< 3 >
2.44 246:23	167:19, 20	222:14	304:22	3 8:18
2.77 268:1	20004-1275	254:13, 17	250 5:8, 23	118:20, 24
2.86 246:17	4:17 5:3	261:19	6:8	120:3
2:21 255:12, 13	20006 5:18	331:1	256 9:15	131:12, 16
2:41 255:15	2000s	371:21, 22	26 8:18	151:4
20 8:13	155:13	372:9	295:14	176:23, 24,
10:15 50:7, 14 51:9	200-2900	2021012	26(a)(2)(B)	25 179:5
55:20 56:4, 6 58:24	3:18	445:22	9:15	210:6, 9
60:24 61:1, 6, 11, 16, 25	2004 393:15	2022 144:5	264 406:24	221:3
62:5, 23	200-and-	207:6, 7, 10,	264.59	275:11
63:9, 15	something	14 339:12	402:23	384:7
64:7, 13	124:5	2023 1:6	266 9:18	445:23
78:6	201 4:5	11:5 29:13	27 280:1, 2	3,163 225:8
113:16	2014 334:14	30:8, 12	273 120:24	3.38 210:18
231:19	2015 115:20	150:7	123:2, 16, 23	3.62 246:19
294:24	143:19	151:17	124:5	3:40 314:4,
295:8	144:3	152:18	126:19	5
307:8	145:4	206:16	127:6	3:56 314:7
312:17	153:25	209:14	128:3, 13, 14	30 6:2
313:1, 13	154:4, 23	445:23	129:8, 11, 19	9:22
316:25	155:4	2029 4:12	133:23	113:16
317:6	156:6, 17, 18	205 9:7	136:7	446:15
319:4, 13	157:7	21 21:3	137:20	300 3:12, 17
326:17	158:25	211:25	429:23	4:12 304:19
327:19, 22	159:6, 12	212:10, 19	279 9:21	3043 1:3
328:21	160:2, 15	210 3:7	28 21:3	30XI0024260
338:20	161:12	21052 6:13	22:25	0 445:21
380:14, 23	206:5	212 2:24	23:10	310 4:6, 13
410:24	334:15	5:9, 14, 24	231:20	311 403:1
	2016 9:22	213 6:19	274:1	312 2:17
	205:23	215 6:3	371:22	10:4
	206:9, 13	217 429:23	372:8	315 6:9
	347:24	218 3:23	28.8 231:21	32 209:22

302:25	47 273:22	6:38 444:5,	23 151:13	250:20
331 10:4	415:21	6	273:25	251:1
35 128:13,	4717 3:17	600 4:5 6:8	387:19	999-2232
15 403:16	4740 3:12	60606 2:16	8.9 232:4	6:14
419:1	474-2911	60-plus	8:55 1:14	
357 289:12	6:9	287:18	11:6	< A >
36104 3:24	495-2333	64 8:13	80 265:13,	A&M 390:1
364 10:8	2:6	302:3	17	a.m 1:14
369 10:11		64112 3:12,	800 3:24	11:6 86:12
380 10:15	< 5 >	18	816 3:13, 18	151:1
387 8:6	5 9:1	656-7066	818 6:14	166:24
397 130:3,	89:19	4:6	836-8000	abandonmen
17, 19	117:3	67 4:21	5:9	t 87:4, 6
	118:2	6th 2:23	859 445:18	ability 445:8
	127:9, 13, 15		877.370.DEP	able 20:7
< 4 >	215:22	< 7 >	S 1:23	23:2 31:15
4 8:21	255:16	7 9:3	898-2034	104:4, 24, 25
125:1, 2, 6	365:3, 25	133:11, 18	3:24	105:15
126:9	370:16	270:1		239:4
167:2	5:36 387:15,	273:25	< 9 >	247:1
176:13, 20	16	302:25	9 9:7	295:7
233:22	5:49 387:18	352:22	205:9, 10, 14	428:8
250:11, 20	50 375:3	353:6	209:16	443:17
251:3	402:25	354:4	220:23	ABNEY 3:5
275:11	500 4:21	399:10	222:2	abnormalitie
4.15 243:18	167:15	70 377:24	233:23	s 26:15
4:36 353:25	542-8000	378:7	399:21	absence
354:1	6:19	701-1100	90 265:13,	335:5
4:56 354:3	555 4:16	3:13	17 273:22	411:25
410 3:6	5:2 6:18	713 2:6	307:18	412:8
4100 2:16	556-2100	715 289:13	90067-2904	absolutely
42 297:14	5:14	737-0500	4:12	61:8
300:1	55th 5:8, 23	5:19	90071 6:18	129:12
421-2800	6:18	741-5220	90401 4:5	158:13
2:24	56th 2:23	2:17	91367 6:13	181:3
424 8:7		77002 2:6	92 240:23,	absorb
435 8:8	< 6 >	775-6101	25	306:8
44 210:17	6 9:1	4:22	9328 445:20	absorbed
440 1:13	128:17, 18,	7-Eleven	973 4:22	291:12
2:5 8:9	23 130:23	5:10	979-1000	absorption
447-0500	133:22		6:3	201:23, 24
3:7	314:8	< 8 >	998 231:3	abused
468-8000	399:10	8 9:5	237:14	288:1
5:24		149:18, 19,		

abusive 440:17	accumulated 29:10	144:10	249:7, 18	357:9, 16
academic 388:9, 10, 15	accurate 333:20	146:14	250:5, 19, 23	363:24
Academy 254:14, 19	446:18	147:6	251:3, 9, 22	365:20
255:1, 5	accusing 67:23	153:16, 23	253:12, 14,	366:10
accept 82:18 83:6	ACETAMIN OPHEN	154:10, 15,	18 254:2, 6,	369:3, 25
281:11, 13	1:3 8:20	19 155:3, 20	16 255:8	370:25
accepted 82:17	9:1, 3, 7, 12,	156:5	258:20	371:18
96:13, 21, 24	18 10:4, 8,	160:2, 16	259:3	372:3
192:20	11, 15 11:10	161:7, 10, 13	267:2, 15, 25	373:10, 21
398:5	15:12, 17	164:2, 19, 23	270:2, 18	374:4, 5, 6, 8,
accepting 88:23, 25	28:7 29:3,	165:2	271:1	15 381:6
access 158:14	4 30:4, 11,	170:25	272:16	382:4
169:23	14 56:10	171:7, 24	273:1, 11	383:5
202:14, 17,	57:1, 7, 16	200:10, 14,	278:9	386:8, 15
20, 21, 23	58:12, 15, 17,	18, 24 201:2,	287:11	397:10
203:8, 13, 14	25 60:8, 13,	21 203:12,	290:10, 12	398:15
accident 336:24	17 61:6, 14	24 206:2	293:2	401:22
accolades 140:22	63:23	210:13, 15	297:5	402:18
accomplishm ents 140:20	83:17, 21	213:22	298:4	403:20
account 265:8, 19	84:3, 8	214:16, 25	299:7	404:12
315:16	106:19	215:7	302:18, 23	405:7, 12
358:4	117:6, 25	216:3	303:2	406:7, 17, 23
360:8	118:1, 12, 13	217:8	304:10	407:22
362:10	119:2, 10	222:2	306:2, 13, 17	419:3, 7
375:24	120:25	224:12, 17	307:1, 5, 25	430:19, 21
377:8 382:1	123:4	226:7, 11, 17,	320:22	433:4
accounted 377:3, 4	124:12, 19,	18, 24, 25	321:1, 7	443:18
accounting 357:15	22 125:18	227:17	323:16	acetyl 244:15
accumulate 252:18	126:3, 5, 7,	228:3, 11, 15,	324:11	331:2
	12, 16, 20, 25	21, 25 229:1,	327:25	achieve 87:16, 18
	127:2	18, 25 230:3	328:10	acid 19:19
	129:9, 13, 24	235:4, 15	329:5, 8	20:10
	130:6, 13	236:12, 18,	333:1, 9, 24	40:24
	131:2, 17	19, 20, 23	334:9	41:13, 17, 20
	132:2, 5, 7,	237:1, 12, 15	335:16	42:2, 16
	19 133:2	238:19	339:24	43:16, 17
	134:10, 13,	239:18	344:4, 22	44:1, 4, 24
	19 135:1, 5,	240:4	345:3	45:2 49:19
	13, 19, 23	242:1	347:12	70:4, 20
	141:16	244:13, 14,	348:11, 14	198:14, 15
		25 245:7, 10,	349:16	337:6
		12, 15 247:2,	354:11, 13,	347:10, 14
		3, 10, 21, 23	23 355:7, 12,	
		248:14, 17	24 356:1, 11	

358:9	240:24	addressed	233:1, 24	417:25
397:9, 11, 21	385:12	374:3	234:2, 9, 17	427:6
398:1, 7	391:11	addresses	235:20, 23	adjust
399:21, 22,	412:15	374:17	239:17	235:7
25 400:1, 5,	acute	ADHD 9:7	240:3, 5	292:10
8, 23, 24	287:23	10:15 30:2,	243:12, 20,	367:2, 18
401:21	ad 433:11	5, 19 33:23	23 245:17,	adjusted
402:8, 17, 22	ADAMS 4:3	40:10, 15, 21	22, 25 246:1,	242:4
403:6	add 17:21	43:15	4, 8, 17, 20	243:19, 22,
406:24	264:10	72:16, 23	247:9, 17, 18,	24 267:21
407:21	357:1	74:13, 18	24 248:8	268:1, 4
415:3	added	85:25	250:13	270:8
acknowledge	17:11 50:1	91:18, 20	254:16	276:2
286:10	addictive	109:18	255:8	362:17, 18
350:13	110:22	132:9	265:10, 14	366:23, 25
373:23, 25	adding	133:3	266:10	367:10, 23
acknowledge	324:8	138:7, 18	267:2, 16, 20,	383:6, 9
d 167:10	addition	139:13, 20,	25 270:4	384:13, 16
286:8 435:3	31:4 45:4	25 141:18	279:6	adjusting
acknowledgi	49:13	146:14	310:22	271:15, 17,
ng 374:13	53:22	154:25	322:4, 16	18
ACKNOWLEDGMENT	55:22	155:20	323:5	adjustment
10:20 447:1	56:22 58:8	156:12, 13,	325:21	264:13
ACOG	70:21	21 160:3, 8,	327:9	adjustments
145:21, 23	85:13	17, 22 161:7,	329:1	384:17
acrylamide	190:10	14 164:2	341:6	
296:23	198:19	181:7, 14, 17	342:12	administered
Acta 115:21	219:11	184:15	347:4, 15	223:9
acted	347:11	185:2	348:10, 14	Administrati
420:16	434:10	186:9, 12, 15	349:5, 16	on 332:15
acting	additional	187:2, 10, 22	351:5	adoption
420:22	18:13, 18	188:3, 5, 11,	357:18	272:6
action	19:3 79:3	16, 21	358:18, 22	277:23
253:2	225:25	190:15, 25	359:1, 2	278:16, 19
433:3	264:10	191:23	360:16	adoptive
445:11, 12	325:25	192:2, 7, 9	361:9	278:9
active	340:9	193:19	366:14	adult 200:3
198:21	341:22	194:15, 23	369:25	423:13, 16
activity	343:6	198:5	371:9	adults 35:25
38:8, 11	346:12	200:1, 8	374:7	advance
actual 49:4	349:7	206:2	382:20	391:22
107:3	392:20	216:12	386:8, 16	Adverse
157:23	additions	231:19, 22	409:24	8:13 37:13,
	262:8, 9	232:8, 9, 16		14 50:4

55:25	aftermath	268:9	Alabama	amanda.hunt
62:22	80:23	277:22	3:24	@kellerpost
65:10, 12, 15	age 11:21	288:8	alcohol	man.com
98:12	225:17	289:10	19:18	2:11
105:17	352:22	291:8	20:10	amend 17:1
109:2, 5, 8	Agency	309:20	225:21	Amended
217:14	51:24, 25	325:19	366:24	9:15 16:23
296:6, 7, 13	151:22	341:10	aliases	18:4 50:12
305:6	agent 78:4	371:3	178:11	120:8
322:23	84:12	377:19, 24	alleged	256:13
326:24	ago 12:18	378:18	430:10	257:1, 22
328:11	34:22 35:8	379:21	allegedly	258:3
337:8	36:13, 22	381:10	427:17	259:13
350:15	37:23	386:12	441:10, 14	261:10
367:15	43:22 53:7	416:2	442:14, 21	263:1, 19
377:24	56:5 99:10	429:11, 15	alleging	264:9
378:7	111:1	433:23	184:10	370:11
382:11	113:16	439:22	ALLEN	American
390:17	119:23, 24	agreed 44:7	3:20	45:8 47:20
410:21, 24	153:2	188:19	allometric	108:18
412:2, 8	155:14	280:2	288:20	254:14, 19
415:8	179:13	349:14	289:1, 20	255:1, 5
417:9, 14	379:8, 12	431:3	290:24	Americas
418:2	394:11	agreement	291:18	5:13
420:19	418:15	12:19	292:8, 22	amount
433:11	agonism	111:8, 12	293:3, 14, 15,	29:11
advice	326:11	agrees	25 294:8	232:10
284:25	agonist	146:12	all-or-	307:5 426:3
334:24	326:7	308:13	nothing	Analyses
335:4	agree 19:14	439:17	19:15 20:3,	8:21 363:1,
advise	47:1 58:3	Ah 219:8	8	5
335:11	134:4	ahead 66:1	allow 38:16	analysis
AED 49:25	144:16	96:17	438:5	46:12 49:9
AEDs 44:8	164:3	274:13	allowed	56:23, 24
affairs	165:23	Aid 6:9	66:18	62:7, 15
180:22	178:1, 14	392:4	439:12	66:16
affect 22:17	189:7	426:22	441:8	72:11
64:1	195:10	aims 391:22	alpha 89:18	83:20, 22
320:22	196:25	air 85:17	91:9 215:21	89:16, 17, 25
357:2	200:14, 16	399:14, 18	alters	90:1, 24
391:24	215:8	al 8:21, 25	422:19	91:6 119:4
affiliated	227:18	9:5, 10, 14,	AMANDA	131:22
388:14	253:16	20 10:3, 10,	2:11	136:10
	265:9, 10	14, 16		137:23

138:2	analyze	204:2, 22	293:18	Antagonism
157:3	235:7	285:24	294:2	323:25
159:16, 17	analyzed	286:1, 15	311:11	326:4, 7, 10
161:15	129:17	288:20	312:8	anti 45:25
163:1	218:2	291:4, 23	329:4	71:21
184:23	analyzing	292:12	343:4, 11	anticipate
185:4, 23	235:21	293:5, 9	345:13	172:6
186:2	236:15, 18	294:11	346:22	anticonvulsa
187:24	anandamide	309:25	347:18	nt 48:4
198:11	326:8	312:11, 12	349:4	70:24 71:17
206:19, 21,	anatomic	328:8, 9, 10,	answer	antidepressa
24 209:11	27:1, 3, 9	12 339:23	96:17	nts 366:19
217:16	anatomy	340:9, 19, 21	100:25	antiepileptic
218:3	395:13	341:4, 22	147:9	43:21, 22, 24
221:2	ancient	342:3, 7, 19,	164:9	45:8 46:1
233:6, 10	76:22	24 343:6, 15	168:4, 20, 25	47:20
237:22	and/or 8:15	344:1	175:16	69:20
249:9	412:18	345:12	194:10	71:13, 15
260:17	Andrea	347:19	208:17	336:16
266:6	372:16	348:25	219:25	
272:25	anesthesiolog	349:7	220:3	antiepileptics
281:11, 22,	ists 34:19	356:22	234:14	48:10 70:6,
25 283:13	Angeles	357:19, 23	236:2	16, 18
284:4	4:12 6:18	379:12, 24	258:24	antioxidant
303:15	animal	380:6, 10	291:25	306:7
311:20, 22	22:20 23:2	398:12	299:20	antipyretics
331:16	24:1 25:12	415:4	312:3	110:9, 14
336:12, 14	35:10	animal-	355:20	anti-vaxxer
338:19, 24	38:23 39:9,	equivalent	361:21	83:4
346:5	16, 24 41:18,	287:8	376:10	antiviral
356:3, 6	20 42:22, 25	animals	403:12	25:18 53:21
357:12	45:3 47:4,	23:3 36:3	418:6	antivirals
358:16	10, 18 48:1,	38:8, 14	440:16	71:21
359:7, 23	5 49:3	92:14	answered	anxiety
361:10	70:2, 15	186:1	291:24	38:13, 15
367:11	71:13	189:14, 17,	answering	39:9, 11
368:7, 10, 11	109:13	20 192:11	175:6	195:2
374:4	170:6	193:1	answers	360:14, 16,
375:23	185:17	195:18	74:14	20 361:8, 12
377:11	192:2	196:17, 24	175:4	363:22
385:14	196:10, 12,	197:8	361:23	364:1, 4
411:3, 6, 10	25 197:17	198:18	424:4 447:5	365:23
412:7	198:4, 6, 16	199:17		366:3, 11, 12,
419:13, 15	199:15	287:6		

20 367:2, 6, 14	317:6, 7, 18 319:4, 13 321:2 325:7, 23 326:17, 23 327:19, 22 328:21 415:15, 21 422:14 432:14 433:9, 15 434:3, 15, 21, 22	238:23 248:8, 17 316:9 317:8 384:19 Appendix 295:7, 15 applicability 342:2 433:14 application 281:4 286:17 290:22 323:18 342:20 applied 24:25 126:7 269:3 270:16 282:2 306:22 384:17 applies 215:8 289:2 293:24 apply 79:6, 9 238:6 293:20, 21 310:10 327:9 328:17 330:14 336:14 359:13, 17 applying 271:9 293:13 325:7, 22 appointed 32:17, 19 389:24	appointment 33:10 appreciate 284:25 343:16 376:10 appreciated 41:16 approach 190:6 268:18 approaching 379:3 appropriate 15:17 113:24 114:19 280:3 335:16 446:6 approved 288:8, 12 292:17 Approximate ly 16:22 22:24 35:8 53:6 167:22 212:24 232:12 289:16 aquinn@mof o.com 5:23 archived 218:2 archiving 122:15 area 95:17 289:18 areas 27:15 argue 44:13 141:13 208:14	argumentativ e 147:10 308:17 arguments 148:4 ARNOLD 5:4 art 431:23 article 12:17 18:10 115:22 119:18 120:13 125:6 129:12 135:11, 12, 15, 20, 24 152:21, 22, 25 178:15 179:4, 7, 8 304:11 305:15, 18, 25 324:22 371:4 373:4 428:4, 9 429:22 430:6 431:6 articles 12:12, 20, 25 18:13, 14, 17 86:22 112:21 114:9 155:12 158:25 159:6, 22 190:4 430:3 ASD 120:25 124:22 126:20 129:9 132:9, 22
--------------------	--	---	---	--

134:10	tman.com	asking	assistants	161:3
138:6	2:12	21:23	34:18	220:8
139:25	aside 263:7	48:21	associate	233:9, 11, 13
154:25	319:20	54:14 56:4	6:23 32:21	234:12, 15
155:21	asked 29:19,	68:18	137:2 347:3	267:1, 24
156:12	20 34:21	84:22	associated	270:10
181:6, 13, 17	35:16	101:21	25:6 26:9	277:20
184:20	52:20	155:7	28:7 35:24	278:23
185:2	53:24 54:8,	168:14	69:13, 24	349:15
186:9, 12, 15	11 74:12	176:6	75:15 76:4	350:15
187:22	101:16, 22,	178:1, 2	78:5	372:2
188:3, 5, 11,	24 102:15,	179:16	124:22	associations
17, 21	18 105:21	180:10	132:22, 23	375:20
190:15, 25	145:20	182:4	133:2	assume
193:19, 22	148:3	184:13	135:20	22:1 72:15
198:4	149:23	208:3, 6	160:7, 19	106:10
200:1, 8	151:9	223:17	195:2	197:16, 19
231:21	162:4, 13	229:14	233:1, 3	228:17
232:8, 11	168:16	262:6, 13	234:21	266:13
234:2	170:24	324:18	249:24	334:16
235:20	174:24	341:18	267:19	352:13
243:12, 23,	176:14	345:2	337:8	assumed
24 245:22,	181:12, 13	369:13	362:9, 11	335:6
23 246:5, 8,	201:8	424:8	367:21	assuming
18, 20	207:4	437:13	373:9, 21	381:16
257:14	208:15, 20	aspect	374:7, 14	assumption
265:9, 14	226:4	318:19	380:9	251:23
334:7	227:14	319:7	381:6	assumptions
341:5	236:1	aspects	382:15	230:6
357:17	249:3	197:1	388:10	as-yet
358:22	289:24	assesses	396:19	378:20
366:14	299:17, 21	194:16	399:5	attached
409:25	300:14	assessing	401:6, 8	10:17
427:7	301:4	357:15	402:14	446:11
ASD/ADHD	305:24	372:4	404:13, 21	447:7
11:10	332:18, 22	Assessment	409:2, 3	attempt
ASD-ADHD	343:24	9:21 10:2	414:13, 18	431:18
1:3	361:19	192:11	416:10, 15	attempted
ASH 6:1	363:22	194:6	431:7	343:25
ASHLEY	381:5	279:14	Association	attend 53:25
2:12 5:22	421:3	280:14	9:11 10:11	attendant
ashley.barrie	441:25	433:13	51:23	346:18
re@kellerpos	442:2, 12, 15	assistance	134:24	attended
	443:2	52:12	160:25	53:8

attendee	182:17	370:21	81:2, 10, 19	235:4, 7, 15,
315:11	183:20	371:16	82:4, 14	17, 21, 23
Attention	attribution	372:15	83:11, 13, 18,	241:25
9:9, 18	350:10	386:5	24 84:13	245:17
73:12	351:2	412:25	85:7, 10, 23,	250:13
Attention-	audience	433:10, 12	24 91:13, 16	258:20
Deficit 9:12	34:12	author's	109:15	259:4
Attention-	audiences	318:17	122:4	278:24
Deficit/Hype	34:15	Autism	124:19	279:3, 22, 25
ractivity	AUGUST	8:23 9:3, 5,	127:3	308:23
10:12	1:6 9:22	7, 9, 13	135:21	309:4, 13, 16,
attenuate	11:5 445:23	21:15, 16, 24	136:3	22 310:6, 9,
269:4	Austin 33:4	22:3, 6, 9	138:18, 23,	22 311:5, 11,
attenuated	388:17	23:3, 9, 16	24 139:4, 13,	14, 22 312:5,
213:18	author	24:7 25:2,	17, 19, 25	10, 18 313:2,
249:16	42:13, 16, 19,	11 26:7, 9,	141:17	8, 14 318:1,
267:16	20 116:7	11, 16 27:1,	146:14	5, 6, 11, 16,
attenuation	119:1	8, 11, 12	148:14, 19	19 319:5, 7,
271:8	220:9	28:2, 8	156:19, 20	14 322:4, 16,
attorney	319:3	29:4 30:11,	160:11, 17	24 323:5, 8,
100:7, 13, 17	420:11	19 33:22	161:10, 14	16 325:21
101:4, 17	435:3	34:23 35:3,	164:3	326:18
102:4, 14	authored	4, 17, 19	184:15, 19	327:1, 9
104:15	332:14	36:6, 15, 22	185:16, 17,	328:23, 25
105:3		37:1, 3, 8	18, 25	334:7
445:10, 11	authoritative	40:7, 14, 21,	186:20	342:12
446:15	155:1	25 41:17, 22	187:2, 5, 9,	347:3, 15, 17
attorneys	159:14	42:15 43:5,	13, 16	360:13, 16
101:9, 23, 25	173:11, 15	13 50:1	191:10, 17	361:9
105:21, 24	181:21	63:5, 8, 11,	192:7, 9	367:25
107:8	authorities	19 68:10, 15,	194:15	368:3
attribute	108:17	22, 25 69:5,	198:24	369:3
187:22	277:18	17, 25 70:6,	199:4	380:9
234:24	278:23	10 72:16, 19,	205:2	396:15, 18
308:23	287:19	22, 25 73:3,	206:2	397:16, 20
309:1	authority	5, 10, 16, 22	208:8	398:7
attributed	174:10	75:1, 8, 13,	214:17	399:6, 9, 19
124:18	279:15	23 76:4, 6,	215:1	400:6, 9, 16,
125:9, 10	authors	10, 16, 18, 21	216:12	23 401:3, 6
attributes	249:4	77:1, 4, 10,	222:3	402:15, 23
375:20	267:1	11, 14, 15, 18,	231:20, 22	403:6
attributing	268:21	23 78:2, 9,	232:16	404:13, 22
151:20	282:22	11, 12, 16	233:2, 24	406:23
	284:9, 21	80:2, 6	234:9, 13, 17	408:11, 15,

18 412:11	Avella-	374:12	200:17	153:21
413:7, 10, 18,	Garcia 9:10	375:8	231:4	155:9
23 414:3, 6,	205:2, 18	376:11, 16	300:17	189:3
14 415:9, 12	Avenue	Baccarelli's	325:11	197:20
416:1, 6, 10,	3:12, 17	372:23	426:20	207:4, 12
16, 18 417:5,	5:13, 18	Back 43:16	backup	212:19
10, 13, 23	average	55:18 66:2,	123:17	213:6, 13
432:15, 19	423:3, 4	8, 9 72:12	126:23	214:22
433:11, 15,	aware	76:22	127:6	215:7, 16
16, 24 434:4,	63:25	86:14	Baker	216:23, 24
5, 14 435:5	124:7	100:9	10:14	227:9, 21
Autism-like	130:9	121:7, 9	261:19	228:24
41:23	149:7, 15	124:13	263:17, 21	237:23
autism-	154:3	148:1	280:17	238:7, 22
specific	165:3	151:3	balance	241:3
434:22	179:17	160:13	221:14	266:4
autistic	223:11	163:18	ballpark	272:18
76:2 185:6	228:22	167:1, 4, 9	167:18	273:12, 15
191:13	278:3, 7	174:22	Bandoli	274:22
194:22	334:10	220:21	10:10	277:10
322:25	336:20	240:22	364:12	283:2, 24
323:8	337:16	254:12	banned	289:18
327:3, 9	338:23	255:15, 18	399:1, 2	291:2, 6, 8
329:4	362:8	275:20	Bar 278:21	292:11
automated	363:23	287:1	BARNES	293:25
346:16, 19	366:12	302:1, 3, 5	4:6, 15, 17	303:14
availability	372:21	314:7, 13	5:1	309:18
203:24	408:12	318:11	barrier	317:7
204:11	410:10, 15	337:17	203:11, 13	324:22
available	425:5, 7, 9	354:3	329:9	352:2, 14
110:10	awareness	360:6	BARRIERE	375:22
121:13	77:18	361:12	2:12	383:13
154:23	< B >	363:21	base 181:16	385:15
162:7	B9 400:2	387:18	426:20	386:11
164:19	babies	396:3	431:12	397:24
178:10	231:15, 18	398:17	based 73:19	420:6 423:7
189:10, 12	baby	402:21	79:1 91:4	basically
190:20	202:24	408:14	93:15 97:7,	231:5
198:19	203:8, 14	410:1	24 118:4	237:13
286:16	323:16	413:6	131:22	262:4
391:22	Baccarelli	420:10	132:21	basics 86:21
417:16	372:17, 18	background	133:8, 9	basis 50:21
	373:1, 6	138:16	139:17	305:4
		159:19	144:22	380:13

Bates	behalf	24 230:12	180:22	395:20
337:18	11:24	311:11	192:5, 16	445:8
348:2	15:14 53:16	312:9, 11	205:22	better
Baylor 15:5,	behavior	322:25	210:16	12:22
6, 9, 14	36:5 73:12	323:8	252:11	196:1
25:14	192:25	327:1	259:22	230:16, 20
32:15, 22, 24	194:7, 8, 14,	329:4	281:10	268:10
71:7, 12	16, 18, 19, 23	347:3, 18	286:8	275:22
75:18	195:4	360:17	295:1	280:11, 12,
91:22, 25	198:10	362:8	299:11	22 336:22
92:1, 16, 19	199:9, 13, 17,	beings	302:7, 11	344:1
105:25	19, 22 200:1	28:10 30:5	308:11, 12,	350:5, 21
106:4, 16, 17,	230:6	44:9 77:1,	14 320:18	385:25
21 149:10	321:24	5 138:17	331:10	Beyer 8:21
163:11	322:21	193:5	332:10	118:16
167:25	330:4, 11	196:6, 18	339:12	119:1
170:22	396:25	209:17	354:23	176:13, 24
171:9, 14, 16	behavioral	266:9	355:6, 11	428:4 429:2
388:11, 13	25:7 36:3	354:25	357:8	beyond
389:8	37:25 38:6	belief 60:21	371:6	20:11
394:24	40:23 69:8	281:17	375:17	bias 168:8
435:24	187:9	beliefs 195:8	377:15	219:4, 6, 10,
436:3, 21, 23	192:12	believe 19:9	378:6, 9	11 220:7, 20
438:4, 16	195:8, 11	26:14	381:22	273:5
440:4, 13, 20	346:4, 7	37:22 53:6	believed	281:7, 10
441:1, 4, 7,	349:4	57:18	19:16 81:9	282:12
11, 23 442:6,	361:11	60:19	206:9 379:9	283:4
15, 22, 24	behaviors	64:24	believes	285:7
443:4, 5, 18,	25:12	69:21 70:6,	281:17	346:20
20	40:25	10 78:2, 8, 9,	336:5, 8	352:4, 10, 14,
BEASLEY	41:23	10 80:2	354:11	16 353:11
3:20	75:12, 15	82:3 86:24	360:7	biased 353:6
began 36:18	77:13	91:12, 17, 23	374:16	biases
beginning	138:24	95:8 113:7	376:2	273:3
22:23 46:6	186:12	127:3	believing	281:18
86:14	187:10	138:1	81:18	biasing
151:3	191:14, 25	143:10	belongs	275:25
167:2	192:5, 17, 20	153:14	194:2	280:9
255:16	193:9, 13, 22	155:19	benzopyrene	bigger
314:8	195:17, 18,	173:10	85:17	413:13
354:4	24 196:4, 6,	174:16	best 47:17	bill 285:1
387:19	12, 13, 16, 17	176:13	49:15	bind 330:16,
begins	198:15, 23,	177:5	198:5	21
350:13	25 199:2, 4,	179:1	278:3	

binder	217:11	202:8	316:10	234:19
295:12	223:12	222:23	389:5	235:23
Binding	225:23, 24	223:4, 8, 10,	415:15	brain 8:16
8:13	231:12	16, 20	BONESTEE	10:13 26:4,
295:21	232:10, 15,	224:10, 25	L 6:14	6, 8, 11, 15
296:22	20, 25 249:8	225:4	book	27:2, 10
297:6	251:12	226:5, 12	157:21	38:19, 20, 23
306:12	315:6	227:20, 23	173:24	198:22
412:16	336:18	228:25	174:2, 4	203:8, 15, 18,
bio 150:17	355:3	230:14, 15	books	25 204:1, 12
	377:24	231:3	174:14	251:10
biochemistry	378:7	236:13, 16	born	321:12, 18,
31:4 34:1,	388:7	237:12	231:16, 18	21 322:13
4 250:9	389:11	238:19, 24	232:4	329:11, 12
Biochimica	420:18, 19,	239:4	345:24	378:19
115:21	21 423:15,	249:7	borrow	412:20
biologic	17 425:1	250:6	171:23	brains
320:19	426:9	251:1, 20	boss 31:9,	198:18
Biological	Bisphenol	307:23	13, 18, 25	
8:21 57:24	398:19	308:3, 5	32:6 389:13	Brandlistuen
79:1 119:3	401:22	330:20	BOSSO	276:18, 19,
296:10	bit 19:11	331:3	5:17	21, 24, 25
310:12	21:6 26:4	356:20	boss's 32:7	bread
311:19, 25	56:5	357:10	Botswana	390:21
325:13, 24	143:21	371:6, 11	35:7	breadth
327:15	230:22	blood-brain	bottom	331:8
331:6	285:22	203:10, 13	263:25	break 65:22
362:23	353:20	329:9	280:1	86:7
biologically	380:18	bloodstream	348:4	150:16, 17
324:21	383:18	203:1	349:25	151:10
327:19	436:11	BMI 225:22	Boulevard	152:16
biology	blank	board 31:8	4:5	163:17
34:4, 5, 6	428:23	140:15	bound	166:21
197:24	429:10	board-	297:21	189:8
Biomarkers	blind 46:9	certified	306:4	211:11
9:11	413:13	31:10, 11	330:7, 19	242:20
392:24	blinded	boarded	bounds	243:2, 8
393:11	46:1 70:11	140:17	49:12	254:11
Biophysica	346:21	BOBBITT	box 199:15	255:10
115:21	blindly	7:1 11:2	boxes 73:15	316:23
birth 10:9	214:12	bodies 278:4	boys 212:10	320:12
16:15	346:1	body 85:3	Bradford	353:18
44:14 69:5,	blood	201:21	79:6, 10, 14	387:5, 10
11, 16	132:12	289:18	180:7	422:18

breaks	builds	129:18	275:10	400:20
356:17	197:25	130:22	276:9	401:16, 20
breathing	bunch 81:7	133:11, 19	279:8	403:13
229:15	397:2	138:10	281:17, 21	404:10
BRENNAN	412:25	140:21	285:3, 17, 23	419:19
4:20	burden	143:23	286:24	423:23
BRIAN 7:1	244:13, 25	146:13	288:7	424:3, 14
11:2	245:7, 10, 15	148:11	298:21	435:14
briefly	247:2, 12, 23	149:19, 22	309:5	437:14
163:25	248:2, 17	151:6	311:5	438:3
Briggs	burying	153:20	312:22	439:25
156:9, 10, 19,	192:23, 25	155:8, 18	314:10, 14	440:3, 13, 20
22 157:2, 14	193:6, 13	158:23	326:2	444:2
158:7, 8, 17,	business	161:1	327:18	445:4
24 159:11,	425:11	164:18	329:25	447:12
23 160:1, 16	butcher	167:5	330:14	Cabrera's
161:12	117:12	187:12, 20	331:1, 11, 15,	23:14 85:8
162:22	butter	188:9	22, 25 341:2	186:6, 18
172:19, 22	390:21	194:13	343:3	206:15
173:11		200:22	348:7	222:22
174:9	< C >	205:10, 15	352:17	230:15
bring	C112 3:6	207:3	354:6, 10, 14,	232:21
111:25	Cabrera	209:6	23 355:6, 11,	235:3
331:19	1:12 8:18	210:25	23 356:18	calculate
410:23	9:15, 17	212:25	357:7	285:24
bringing	11:14, 20	213:2	359:2, 5	291:22
419:1	13:20, 21	222:6, 11	360:7	292:6
broke	14:4 23:10	226:4	361:13	293:19
237:12, 19	25:3 32:12	233:6	364:21	calculated
238:4	57:6 60:23	240:2	365:13	286:1, 4
242:25	64:3, 21	242:9	366:16	293:9
broken	72:21 79:2,	244:4	367:10, 24	294:18
238:16	9 82:19	249:6	369:17	calculating
brought	86:17, 24	250:25	375:7	286:11
112:1	89:13	252:20, 25	376:1, 4, 15	288:24
390:23	91:12 96:9	254:22	377:20, 23	calculation
409:12	111:21	255:10, 18	378:6	286:18
426:17	112:7	256:7, 22	380:14, 20,	290:15, 16
428:13	115:19	258:17	24 381:4	294:15
BROWN	116:9	262:7	382:13	calculations
6:14	118:20, 23	266:21, 24	383:16	294:10
browser	125:2, 5	272:25	385:3	California
113:23	127:4, 9, 14	273:7	386:13	1:18 4:5,
build 197:22	128:18, 21	274:3	387:22	

12 6:13, 18	118:9	8 297:15	201:9	10 357:11,
445:17	119:9	311:18	327:13	15 427:21
call 94:13	120:7	Case 1:4	CAST	causally
175:21	177:5, 19	10:1 19:17	213:11	233:1
199:14	179:2, 8	65:17 75:9	221:18	causation
272:4 282:6	405:4, 8, 15	76:12, 17	catch	39:2 78:21,
called	capture	88:24 96:2	389:10	24 87:14, 15
115:20	223:5	97:8 100:9	catechol-O-	147:15
116:7	239:4	104:3	methyltransf	157:15
219:6	264:19, 23	172:5, 7	erase 117:10	159:5, 10, 15,
266:12	carb 39:5	175:19	categories	16 160:25
304:15	carbon	182:21, 24	320:19	161:4, 15, 20
305:21	62:10, 16	183:3	395:1, 5	162:23, 24
340:3	299:18	184:1	CATHERIN	163:1, 8
388:5	300:9	185:17	E 2:22	169:13
390:14	301:5, 7, 17	194:3	catherine.hea	179:14
412:16	302:23	215:13	cox@lanierla	180:3
calling 38:6	carcinogen	235:15	wfirm.com	181:17
433:8	10:2	265:12	2:23	182:6
calls 335:12	care 169:7	325:4	causal 28:2	184:19
Campbell	217:23	352:7	83:25	185:12
1:16 3:16	267:3	381:12	102:22	187:22
445:2, 16	career 16:2	426:2	155:19	200:22
CANAAN	196:9	432:25	157:5	205:6
5:12	careful	436:5	206:9, 16	206:8, 18, 23
canada.ca	103:13, 23	437:2	207:15	207:21
315:25	carefully	438:6, 17	209:7, 11	208:4, 11
316:4	433:7 446:4	case-by-case	232:22	220:24
Canadian	Carolina	380:13	254:15	221:4
316:2	121:8	Cases 1:6	255:7	233:12, 14
cancer	Carolinas	89:25	328:25	234:24
303:16, 23	121:8	100:20	349:15	249:9
cancers	Carr 9:7	101:14	370:22	269:15
355:14	Carrie 1:15	107:1	371:19	282:17
356:20	445:2, 16	182:25	386:6, 15, 19	310:9
357:10	carries	185:2	causality	311:15
cannabinoid	155:6	197:3	79:8, 11, 15	312:17
55:24	carry	250:3	83:20	325:3
capacity	277:24	287:23	206:20	326:3
232:24	CARTMELL	379:5 426:9	311:19, 22	367:11
298:9	3:9	Case-	331:6, 9	372:5
Capicua	cascade	specific	350:6, 21	432:7, 12
117:14, 15,	56:22 59:7,	172:13, 16	356:3, 5, 6,	causative
16, 18, 24		184:12		78:4, 18

79:4, 17	404:21	caution		370:10
84:12, 13	423:14	269:10	certifications	379:25
154:18	caused	cell 170:13	31:8 140:15	380:11
427:19	44:14	330:4, 10	Certified	433:17
Cause 9:7	59:15	430:25	1:17, 18, 20	434:22
16:14 22:2	76:16 94:4	cells 56:12	31:22 32:1	changes
43:5 59:21	100:18	170:14, 16	445:2, 3, 17,	18:5, 7
60:14, 15, 18	101:6	321:24, 25	18, 19, 20, 21,	27:11, 25
61:1 68:14,	102:6	322:2, 20, 22	22	28:4, 6
21, 23 69:21	103:21	330:4, 5, 8,	certify	39:5, 23
70:6, 10	104:14	11 357:3	445:3, 6, 8	74:25
77:23	105:5	cellular	447:4	135:18
78:12 80:6,	140:5	170:11	cetera	136:1
10 81:10	148:18	171:4	401:22	256:19
82:4, 13	208:8	322:15	chair 389:19	259:13
83:11, 15, 17	234:10	323:9	challenge	261:10
85:10	276:11	Center	283:2	262:4, 8, 15,
91:13, 17	287:23	394:16, 17,	chance	19, 21, 24
94:1 96:10	310:2	23	43:23	263:1, 4
98:17	causes	Central	90:15	318:15
109:15, 18	16:12	1:15 11:6	114:5	322:20
138:7, 23	26:11 29:4	241:8, 15	151:12	324:12
139:4	30:5 38:16	Century	316:21	328:9
164:2	39:13	4:12	363:6	329:13
206:2	76:10 78:2	cerebellar	change 40:1	345:19
271:11	80:2	27:7	116:17	390:16
276:4	154:24	cerebellum	154:9	405:19
279:3, 6, 22	160:2, 16	27:17	264:14	406:17
281:8	161:7, 10, 14	cerebral	330:3, 8, 11	414:22
321:2, 8	222:3	27:16	405:14	415:4
322:13	233:4	certainly	414:3, 6, 13	446:10
329:12	234:17	61:9 189:1	430:24	447:6
354:11, 14	235:15, 17	195:23	433:10	changing
355:8, 10, 14,	240:4	430:12	435:5 448:3	123:6, 11
25 359:3, 9,	354:24	certainty	changed	261:18
14 366:13	357:9	253:3	134:25	321:24
367:15	398:7	423:8, 11	144:9	322:19
377:25	403:6	CERTIFICA	145:4	330:9
378:8	408:11	TE 445:1	155:3	characteristi
399:19	causing	CERTIFICA	156:1, 5, 6	cs 231:7
400:5	149:11	TE	157:10	365:4
401:7	235:20445	248:1	characterize
402:14	397:15	10:19	334:22	d 395:20
			348:17	

CHARCHA	chemistry	choose	381:18, 21	19, 20, 21
LIS 4:11	34:4	244:10	429:13	32:2, 4, 5, 15
176:24	300:15, 18	chose	citations	33:1, 3, 5, 8,
charge 10:4	418:23	434:23	114:8	9, 11, 12, 13,
charged	cherry-	chromosome	cite 118:16	16, 19 34:1,
167:17	picking	356:17	122:12	8, 9, 10, 11
Charlie	260:2, 4	Chung 67:1,	147:21	52:18
151:21	Chicago	2, 5, 8, 11	205:2 210:8	173:24
chart	2:16	68:9 138:2,	cited 64:14	174:1
257:17	Child 52:23	5 139:11	119:6	classes 31:3
258:2, 9	210:3	141:8	121:1	classic 197:6
305:16	225:22	276:7	135:11	Classically
401:23	231:7, 8	364:10	162:17	19:16, 25
cheated	267:25	375:20	203:22, 23	clear 97:21
164:13	336:22	409:12	204:3	98:14
check 46:15	353:15	Chung's	205:20	100:20, 25
136:7	361:5, 9	68:20	212:15	103:15
177:11	374:7	140:6, 25	216:11	105:20
checked	Childhood	141:7	286:11	118:3
73:16	9:13	278:12	368:1	129:15
177:13, 16	children	chylomicron	cites 374:16,	134:11
chemical	148:18	202:5	20	139:15
390:13	149:6	CIC 118:8	City 3:12,	146:22, 24
393:8	211:12	176:14	18	159:9
397:21	212:1, 19	177:5, 18	claim	166:9
398:2	214:3	179:2	342:21	171:5
418:19	222:3	405:4	381:17	204:14
chemical-	309:25	427:23	clarification	211:18
disease	352:8, 11, 23	428:1, 9	87:7 102:11	215:18
392:2	353:8	circulating	clarify	225:7
chemical-	China	252:13	58:22 88:7	229:5
gene/protein	28:13, 20	circulation	180:15	240:6
392:1, 11	chloride	202:11, 12,	195:14	245:24
395:7	296:23	13, 16	250:22	249:11
chemical-	chlorines	circumstance	259:15	267:18
phenotype	301:23	249:17	269:17	272:18
392:22	chloroform	335:16	329:21	276:25
chemicals	298:5, 8	432:8	clarifying	290:23
8:14 67:21	299:7	citation	102:8	304:5
395:6	300:3, 9, 11	65:6 260:7	204:8 298:2	307:20
396:8	301:11	278:15	Clark 95:21	310:23
397:7	302:24	364:6	class 30:24,	337:1
412:17	chloroforms		25 31:1, 5, 6,	357:19
	301:14		14, 15, 17, 18,	374:19

425:18	220:2	375:8	combination	comment
434:2, 15	307:6	376:17	47:3	142:1
clearly	342:20, 21	collect	combs	351:22
307:23	350:7, 22	217:21	136:25	comments
433:9	389:17	346:25	come 12:21	348:24
cleft 20:17,	clinically	352:1	20:15 29:2,	421:2
24 21:1, 6, 9,	69:8	collected	7 30:4	Commerce
13	196:22	216:4	38:5 41:6	3:23
clefting	288:3	217:7	66:2, 9	commission
21:1 92:14	Clinton 6:8	224:11, 19	90:3	447:17
click 128:6,	close 224:2	236:16	100:17	Committee
11, 14 129:2	341:5	351:14, 24	101:5	9:21
396:6	351:23	collection	124:2, 5	180:23
397:3, 6	closed 83:2	223:15	127:3	279:14
404:16, 23	151:23	346:24	144:20	common
405:6, 10	153:8	collectively	148:1	51:1 56:10
406:1	349:17	75:14	157:2	218:23
416:21	closer	97:12	159:23	382:5
417:3	225:11	141:20	198:6	420:6 427:6
419:14	closure	collects	304:10	
429:20	21:19 22:23	217:17, 20	326:23	commonality
430:11	clustering	College	334:21	432:20
clicked	303:15	15:5, 6, 9	360:2	commonly
403:17	305:1	33:4	398:17	89:17
427:23, 24	cognitive	108:19	404:17	122:13
428:2	396:20	388:11, 14	419:6 428:1	193:2
430:16	cohort 10:9	389:8	comes 83:7	201:11
clicking	216:18, 19	435:24	105:17	communicate
405:3, 4	228:6	436:3	195:5	d 248:23
415:7 419:1	coin 417:6	438:4, 16	220:9	communicati
ClinGen	coincide	443:18	408:15	on 73:13
122:9	22:24	Colorado	413:7 415:8	74:10
clinical	coincided	95:18, 24	comfortable	111:15
49:8 77:7,	92:17	column	114:23	249:4
14 139:17	coincides	210:17	133:15	396:24
158:21	22:8, 20	212:14	134:20	441:14, 19,
165:24	cold 166:14	231:24, 25	251:16	21 442:23
166:2	colleague	233:18	coming	community
170:21	32:7 41:14	241:25	135:24	398:6, 7
189:3	75:17	243:15	commenceme	403:5
192:8, 9	colleagues	270:6, 17	nt 445:3	companies
193:10, 14	373:2, 7	381:10, 14	commencing	163:16
196:22	374:12	383:4, 18	1:14	company
219:19				25:20

106:12, 14, 16, 22 163:3, 6 426:15 442:5, 7, 10, 11 443:5, 8, 10, 12	complete 271:8 329:16, 22 330:3 completely 83:2 249:16 267:16 component 265:20 358:24 372:4 compound 25:5, 16 34:24 35:1 37:5 38:6, 16 39:1 40:6 43:4 52:13, 25 54:9, 12 56:8, 10 57:2 69:16 78:4 79:25 84:6 126:13 137:2 164:12 301:10 427:18 432:3 compounds 55:7 57:11 58:7, 10, 15 59:5, 21 62:19 63:22 68:6, 14, 16, 21 70:23 71:4 76:19 85:18 158:12 393:7 comprehensi ve 413:18	computer 84:17 183:18 426:18 428:13 430:16 COMT 405:3, 18, 20 concentratio n-dependent 240:15 249:13 concentratio ns 200:6 371:10 concern 147:1, 25 148:13 276:4 281:8 282:2 335:23 340:15 374:2 concerned 146:19 147:4 149:11 282:16 353:7 362:2 concerns 283:3 399:7 conclude 93:20 386:5 427:21 concluded 254:15 255:6 444:6 conclusion 29:3 30:4 40:1 43:9 92:10 100:18	101:5 144:8 154:24 157:2 284:3, 8 304:10 325:3 340:8 355:5 conclusions 38:5, 25 39:8 70:12 82:9 93:6 144:21 340:16 348:21 369:6 386:3 411:18 concurrently 30:6, 7 80:16, 17 113:4 condition 352:12 359:19 366:14 382:14 427:12 conditions 138:18 231:9 conduct 56:23 72:5 89:17 170:2 171:1, 3 359:6 368:4 conducted 30:16, 18 45:16 80:23 83:19 157:3 159:17	209:10 357:11 368:22 conducting 70:1 282:25 conference 53:4, 8, 16, 19 54:16 315:11 confidence 87:25 88:6, 14 89:4 211:23 213:14 239:24 268:6 383:6, 11 384:20 CONFIDEN TIAL 1:6 103:10 104:3, 18, 23, 24 105:10, 13 confidentialit y 103:13 confidentiall y 105:7 confines 148:5 conflict 106:7, 11, 15 171:6, 8, 12 442:4 443:9, 11, 14 confounders 357:14, 20, 23 358:3 362:13 confounding 360:6, 22 361:14, 15 362:5 366:2
---	--	--	--	--

373:8, 19	319:7	146:4	contained	271:10, 16
375:9, 17	327:13	155:4	107:24	275:21, 22,
376:17, 23,	358:13, 15,	192:1, 2, 5,	context	23 276:24
24 381:25	19 360:21	17 221:12	85:21 86:2	277:17
399:13	361:14	251:14	92:23 93:7	280:22, 23
confused	considered	288:5	94:8, 14, 24	281:2
32:9 245:9	28:22	292:23, 24	176:7	283:3
congenital	115:1	307:8	279:24	285:6
16:3 24:8	156:2	309:1, 23	289:5	347:10
44:8 49:19	161:18, 21	310:24	291:21	374:3, 22
68:12, 15, 23	162:22, 25	312:9	337:21, 22	377:1
69:2, 21	188:10	355:18	390:24	395:23
93:10 94:6,	197:14	356:5, 9	continue	controlled
7 109:11	198:12	365:24	348:15	109:4
190:10	213:7	370:14	continues	165:20
234:22	221:1	consistently	21:20	268:10
354:24	244:1	221:20	22:14 23:5	270:21
connected	246:6	384:7, 9	151:22	280:12
124:18	260:15	constantly	240:13	controlling
427:17	275:6	46:21	continuing	265:21, 23
connecting	360:19	consult	12:21	controls
313:7	361:17	106:2	334:11	268:13
connection	366:4 400:3	consultant	423:21	controversy
51:16	considering	29:25	continuous	80:22
102:23	163:8	consulted	21:18	convention
Connectivity	179:14	442:10	233:20	89:23
10:14	247:12	consulting	235:5, 16	90:18 91:5
	344:13	103:5	continuum	conversation
consequences	consistency	106:22	396:19	318:14
149:5	350:14	Consumer	contraindicat	333:4
consider	384:4	4:23	ed 234:20	conversation
83:3	consistent	consumes	409:5	s 103:1, 4
169:12, 20	18:19, 24	254:6 305:9	contraindicat	conversely
182:6, 8, 13	24:1 39:14	contact	ions 110:14	88:2
186:15	59:20	54:19	contribute	convert
188:8	66:17	282:7	399:19	292:11
190:23	72:19 75:1,	334:25	contributing	293:5
191:1, 6	8, 13, 25	335:20	146:20	converting
213:2, 16	77:6, 13	contacted	control	294:11
215:23	83:20, 24	52:12 54:4,	9:19 239:9,	379:13
219:23	124:23	25 107:23	12 267:6, 14,	conveyed
221:24	139:19, 20	108:16	23 268:15,	104:8
299:13	141:1, 8	contain	16 269:2	convinced
318:19	145:8	129:24	270:16	85:10

coordination	331:3	7 47:14, 22	113:16, 20	184:15
309:14	371:6, 11	49:6, 12, 21	114:10, 16	185:8
310:7	core 33:8,	50:1, 2, 14,	115:1	186:20, 21
co-PI	11 40:25	15 51:11	117:7, 8, 20	187:5, 13, 23
389:18	75:15	52:6 54:12,	118:2, 15	188:3, 4, 12,
copied	186:12	17 55:9, 16	120:4, 9, 10	22 189:6, 16,
317:6, 12	187:1, 10	56:7, 15, 16	122:13, 22	25 191:17
copies 99:7	191:13	57:9, 21, 22	126:13, 20,	192:7, 23
115:24	193:22	58:6, 12, 16	25 127:25	193:7
313:20	194:8	59:3, 12, 23	128:1	196:19
copy 65:17,	198:12, 15,	60:2, 20	129:5, 9, 10,	197:18
19, 22 66:4	25 199:3, 22	63:6, 12, 20	14, 21 130:1,	200:4, 24, 25
99:2 112:5,	311:11	65:4 66:15	13 131:18	201:7, 17, 22
6 295:1	312:9, 10	68:13, 24	132:13, 19	202:1
300:21	322:25	69:11, 17, 18,	133:4, 23	203:2, 6, 19,
313:16, 18,	323:8	22, 23, 25	134:15	20, 25
22, 24 319:2	325:15	72:23	135:24	205:24
381:1	326:25	74:20	137:4, 21	206:7
Cord 9:11	329:4	75:23, 24	138:3, 4, 8,	209:14, 15,
132:11	347:17	76:16	20 139:14	23, 24 211:5,
222:23	core-	78:13 79:4,	140:1, 11, 16,	17 212:2, 11,
223:4, 8, 10,	defining	11, 18 80:19	21 141:3	12, 16, 17, 20
15, 20, 22, 23	396:22	81:3, 10	142:10, 13,	214:7, 18
224:10, 18,	Corporation	82:14	17, 20 143:1,	215:2, 17
25 225:4	5:4, 25 6:4	83:18	14 144:6, 11,	216:15
226:5, 11	correct	84:13	23 145:9	220:15
227:20, 23	13:22, 23	87:24 88:6,	148:20	223:14, 24
228:25	14:22	16, 21 89:8,	149:1, 6	225:1, 2, 5
230:14, 15	15:25	23 90:16, 17	153:4, 17	226:8, 19, 23
231:3	16:20, 24, 25	91:5 95:3,	154:4, 11, 12	227:4
236:13, 15	18:10, 11	4, 12, 13	158:3, 25	232:11
237:11	19:8 24:7	96:11 97:5,	159:6, 12, 24,	233:25
238:19, 24	28:11, 12	17 98:18, 19	25 160:3, 17	236:14
239:4	30:20	100:14, 19	161:4, 5, 7, 8,	239:20
244:12, 24	31:23 32:8,	101:7	10, 11, 14	240:5
245:10	16 34:2	102:7	163:4, 5, 9	241:1, 21
247:1	35:20	103:21	165:2, 6, 20	242:3
248:16	36:19, 23	104:15	166:8	246:11
249:7	37:6, 7	105:11, 19	167:12	247:13, 25
250:6	40:18	106:20	169:14, 20,	250:21
251:1, 20	43:11, 18, 19,	107:4	25 171:24	251:4, 12, 22
307:23	22 44:3, 9,	108:7	180:6	252:20
308:3, 5	18, 19, 24	109:16, 17	181:8, 12, 18	253:3, 18
330:20	45:24 46:2,	112:25	182:12, 19	256:21

258:21	347:4	corrected	246:14	105:1, 15
259:4, 7, 10,	355:22	17:4, 10, 12	294:25	253:2
11, 14, 17	356:12, 20	262:3	365:11	445:18, 20,
260:16	367:3, 12	Corrections	445:10, 11	21, 22
261:22	368:18	17:13	counseling	446:19
262:17	371:19, 22	446:4, 7	31:5, 6	cover 34:10
264:20	374:17	447:6	counselors	121:22
265:3, 4	375:11	correctly	121:23	246:12
266:10	376:2	133:16	counsel's	covered
269:16	378:12, 13	319:10	246:16	410:18
271:4	382:16	372:6	count 81:5	COVID
272:10, 17	383:8	correlate	120:15	30:15
273:2, 12	385:13	137:1	381:25	crazy 440:5
274:7	386:16	226:12	counted	create
275:3	390:9	correlated	13:1	73:24
277:21	391:10	69:1	counting	220:19
278:6	397:5, 17	correlation	134:7	322:16
280:13	398:16	258:19	countries	368:22
281:12, 20	399:16	259:2	216:15, 23	created
284:4	402:24	267:15	217:8	148:5 149:7
285:18, 25	403:3	270:3, 9	country	creating
288:13, 17	406:4, 25	353:14	68:5 336:5,	59:19
291:14, 15	407:9	correlations	8	440:10
297:10	408:3, 25	366:10	counts	443:13
298:6	411:3, 4, 8	corresponde	186:20	credit 33:11
300:4	412:23	nce 55:1	couple	213:3
306:5, 23	413:1, 21	180:19	34:21	criminals
309:5, 16, 22	417:12	340:14	37:22	67:12, 19, 24
310:22	419:18	corrupted	45:14	236:4
311:23	420:11	249:16	111:3	crisis 146:21
315:22	426:24, 25	cortex	115:6	CRISTINA
316:25	427:13, 19	26:23 27:16	370:18	2:21
317:7, 20	428:7, 9, 14	Costco 5:4	371:24	cristina.delis
318:1, 12, 22	431:21	COTE 1:6	413:12	e@lanierlawf
319:11	432:8	Counsel 4:6,	430:17	irm.com
322:17	433:25	22 5:4, 9, 19,	course	2:22
323:5	435:6	25 6:4, 9, 14,	183:16	criteria
324:7	436:6, 19, 23	19 11:15	COURT	73:5, 10, 23
325:21	438:21	48:3	1:1, 20	74:15, 20
327:5, 6, 10,	441:11	112:20	11:12, 17	113:7
21 329:1, 14,	443:22	113:24	96:14	123:1, 8, 9
17 335:17	447:5	115:8	98:21	196:21
342:12		244:5	103:8, 16, 19	227:21
343:14		245:5	104:25	431:4

critical 20:20 22:11 23:1, 8, 9, 21 350:9, 25	cryptorchidis m 160:7, 21 CT 391:15 CTD 391:18, 21 393:15	cysteine 244:15, 18 245:2 250:2 307:22 330:19 331:2	143:21 148:25 157:11 159:2 163:7 164:4, 19 165:2 180:4 181:18 182:9, 11 186:4 195:5 197:21 204:10, 17 211:6 212:18 213:7 215:22, 24 216:2 217:6, 17 218:7 239:16 240:7, 24 242:12 246:13 247:7 251:13 260:2, 5 263:6 269:5 274:5, 9, 19 276:10 280:12, 15, 18 281:24 286:25 291:3 311:25 318:10 324:25 325:23, 25 328:16 331:8 338:3, 4 340:9, 18	342:19, 23, 25 343:6 344:13, 14 346:18, 23, 25 348:1, 16 349:14 350:1, 5, 21 351:14, 17, 25 352:1 355:4, 9, 17, 24 356:2, 4, 8 360:7 361:7 368:4, 16 369:3 386:18 392:3, 4, 22 393:5 395:1, 5 409:23 418:19 428:10, 16, 21 431:19 435:6 Database 9:1, 3 48:18 65:10 121:1, 5, 6, 13 122:5, 10, 14, 20 123:6, 8 124:24 126:16, 22, 24 127:1, 7, 20, 22 128:2, 7 130:4, 8, 11, 15 131:22 133:6 134:12, 14, 15 135:6 136:6, 15, 19 137:18 177:23
criticism 273:4 294:17 333:16 409:11	culture 170:10 cultures 170:13, 15	< D > dad 361:1 daily 289:17 293:4 dam 345:22 damage 56:12 57:3, 20 59:19 60:15 288:6 321:22 322:14, 15 356:13 DANA 6:1 dangerous 68:7, 11, 16 109:24 110:4 DANIEL 6:22 data 27:20 48:8, 14, 22 49:3, 4, 15 51:7 55:13 60:7, 10, 22 70:12 82:25 85:15 119:12, 19, 21 120:13 124:1, 20 130:16 132:2 136:1 139:13	342:19, 23, 25 343:6 344:13, 14 346:18, 23, 25 348:1, 16 349:14 350:1, 5, 21 351:14, 17, 25 352:1 355:4, 9, 17, 24 356:2, 4, 8 360:7 361:7 368:4, 16 369:3 386:18 392:3, 4, 22 393:5 395:1, 5 409:23 418:19 428:10, 16, 21 431:19 435:6 Database 9:1, 3 48:18 65:10 121:1, 5, 6, 13 122:5, 10, 14, 20 123:6, 8 124:24 126:16, 22, 24 127:1, 7, 20, 22 128:2, 7 130:4, 8, 11, 15 131:22 133:6 134:12, 14, 15 135:6 136:6, 15, 19 137:18 177:23	
criticisms 97:21 420:12	curated 391:25 curation 392:21	current 49:12 139:18 154:10 157:23 259:10 263:11, 12, 13 335:11 currently 33:2 70:1, 7 199:20 201:11 324:10 325:1 380:7 389:18 420:21 432:9 cutoff 238:7 CV 93:2 CYP2E1 303:14, 24 304:5, 13, 17 305:9, 12, 19, 20 306:19 CYP2E1's 302:25 CYP2E's 302:24	143:21 148:25 157:11 159:2 163:7 164:4, 19 165:2 180:4 181:18 182:9, 11 186:4 195:5 197:21 204:10, 17 211:6 212:18 213:7 215:22, 24 216:2 217:6, 17 218:7 239:16 240:7, 24 242:12 246:13 247:7 251:13 260:2, 5 263:6 269:5 274:5, 9, 19 276:10 280:12, 15, 18 281:24 286:25 291:3 311:25 318:10 324:25 325:23, 25 328:16 331:8 338:3, 4 340:9, 18	342:19, 23, 25 343:6 344:13, 14 346:18, 23, 25 348:1, 16 349:14 350:1, 5, 21 351:14, 17, 25 352:1 355:4, 9, 17, 24 356:2, 4, 8 360:7 361:7 368:4, 16 369:3 386:18 392:3, 4, 22 393:5 395:1, 5 409:23 418:19 428:10, 16, 21 431:19 435:6 Database 9:1, 3 48:18 65:10 121:1, 5, 6, 13 122:5, 10, 14, 20 123:6, 8 124:24 126:16, 22, 24 127:1, 7, 20, 22 128:2, 7 130:4, 8, 11, 15 131:22 133:6 134:12, 14, 15 135:6 136:6, 15, 19 137:18 177:23
criticize 139:11 277:17 420:8				
criticized 138:1 293:8				
criticizing 68:20 138:2 140:7 275:21 333:13				
cross 202:18, 22 203:1, 10 211:23 239:22 243:25 384:19 385:1				
crosses 203:12 211:19				
CROSS- EXAMINAT ION 387:20				
crossing 383:15				
CROW 3:20				
crumble 411:12				

178:9, 18, 19, 25 179:2, 3, 9 205:1 209:17, 20 216:13, 20 267:3 269:5 390:24 391:4, 12, 19, 22 394:2 397:19 404:11, 19, 20 405:5 406:6 407:16 409:8 410:6, 14, 17, 25 411:21 412:1 418:15, 17, 21 426:18, 20 427:4, 9 428:2 databases 121:12, 16, 18 216:14 390:25 401:24 418:22, 23, 24 dataset 119:12, 14, 15 197:20 215:2 216:22 224:25 249:10 250:19 266:24, 25 276:23 date 1:15 11:5 69:25 150:4 153:21	334:5 350:18 371:4 445:7 446:9 447:12 dated 151:16 445:23 daughters 215:1 DAVID 6:7 day 155:6 227:13 228:9 251:12 273:22 274:7 275:11, 12, 13 289:13, 14 343:4 390:20 392:12 418:4, 17 447:16 days 12:18 19:13, 21 20:12 21:3 22:22, 25 23:10 155:14 230:2 237:3, 4 252:2, 5, 6 270:3, 17 273:20, 21, 25 274:1, 2, 5 275:10 446:15 DC 4:17 5:3, 18 de 356:10, 14 359:25	360:3 deal 414:21 deals 390:3, 6 DEAN 6:9 DEANNA 4:15 death 190:12 debate 287:17 289:8 334:12 debilitating 361:18 debunked 80:15, 19 decades 43:18 49:21 71:16 decide 169:8 431:20 decided 212:25 deciding 441:23 decision 82:16 215:16 243:7 decrease 61:9, 14 88:9, 16, 18 89:9 406:20 decreased 63:11 160:8, 22 215:3 221:21 400:16 decreases 60:18	deemed 214:8 446:18 deep 428:16, 21 defect 24:4 38:17 39:13 42:2 53:10 69:6, 11 100:19 101:6 102:6 103:21 104:14 334:8 400:16 425:1 426:9 defects 16:3, 7, 9, 15, 16 20:12 25:6 26:22 33:7 35:6, 15, 20 37:21 44:15 55:16 69:3, 12, 17 85:4, 5 94:7 96:11 98:17 188:15, 20 217:11 250:16, 17 315:6 336:18 354:15 355:3 388:8 389:11 401:1 420:19, 21 423:15, 18 Defendant 11:24 426:2	defending 44:12 67:12, 24 236:3 320:3 defense 68:5 141:10 293:8 294:17 307:15 425:19, 22 deficiencies 410:19 411:16 418:7 420:9 deficiency 342:22 deficit 9:19 69:1 190:11 deficits 309:13, 14 310:5, 7 311:17 define 20:21 241:6 264:16 defined 210:14 395:17 defines 238:14 396:18 definitely 178:13 437:5 definition 216:17 264:22 definitive 181:20 254:15 255:7 386:6
--	--	--	--	--

degree 300:16 423:11	Depending 65:21 78:14	deposition 1:11 10:17 11:8 14:2	126:17 136:17 137:20	detecting 250:5
degrees 31:7 34:3 140:19	89:24 90:1 91:6 133:9 223:8, 20	98:24 99:17 100:6, 11, 16	157:8, 12 249:17 296:18	detection 242:19, 24 243:2, 10, 16
delete 433:12, 13	224:3 237:11	102:13, 18, 19, 25	323:14 326:21, 23	determinatio n 157:16
DELISE 2:21	430:24	112:20 144:14	391:20 392:16	169:14 189:3
delivery 223:16, 24, 25 224:1, 3 225:18, 23 226:23 228:9 236:14, 16 239:5	depends 76:11, 17 110:12 236:6 265:12 339:10 362:6 371:8	147:12 163:6 169:6 175:3 207:22 208:12	describes 59:18 63:10 126:1	determinatio ns 42:23
Dell 388:19	deplete 57:8 58:5, 16, 17 60:25	320:3 332:24 389:13 444:6	describing 419:10, 12	determine 78:21, 23 79:7, 10 269:14 287:2, 6 293:4 345:19
demographic s 231:5	329:10	446:3, 12, 16, 17	Description 8:12 258:12, 15 261:19 262:9 263:15, 17, 20 264:1	379:3 431:9
demonstrate 78:24 386:19 432:12	depleted 59:11 60:16	depositions 99:18, 20 207:19 208:24	design 265:7, 19, 23 267:6 272:20 275:22 280:3 281:6, 15, 18, 25 282:3 283:25 285:5, 9 345:3, 8	determined 79:17 97:4 206:19, 23 279:23 358:6 368:2 369:1, 10
demonstrate d 26:20 27:6 45:4	depletes 61:6	depression 361:20, 24 362:5, 9, 12 363:22 364:1, 4 365:23 366:3, 11, 12, 20 367:2, 6, 14	designs 190:19 278:1 280:10	determining 251:5
demonstrates 281:3	depleting 59:1 252:7	depos @golko w.com 1:23	despite 336:17	detrimental 68:3 74:4, 7
demonstrativ e 63:18	depletion 56:19, 21 61:1 321:3 329:16, 22 330:3	depth 331:8	detail 80:4	develop 343:14 418:8
DENISE 1:5 41:15 42:18	deponent 11:14 447:1	derivative 79:24	detected 242:17, 18 248:6, 7 307:22	developed 192:15 208:21
deny 97:15 368:25	DEPONENT44 7 10:20	derive 123:25		developing 232:16 252:15 322:22 352:14
Depakote 41:12 49:20	deposed 100:22 101:3, 11, 14 102:2	described 56:9 63:7		development 8:16 16:6, 9 22:3, 12,
department 389:20	deposes 11:23			
depend 90:24	deposing 446:14			

13, 18 23:20	192:8, 10	196:23	200:4	307:16
24:6 25:11	193:10, 15	197:14, 15	203:23	376:6
52:23 63:2,	196:20, 22	199:18	director	disaviews
4 77:10	267:20	221:12	41:10	284:9
115:23	413:23	225:15	dis 280:6	disclaimer
173:17	427:14	258:22	disabilities	427:10
190:9	diagnostic	262:7	184:25	443:10
251:10	73:4, 7, 10	266:3	185:3	disclose
329:13	74:20 189:3	277:1, 3, 5, 9	disability	104:5, 8, 12
392:5		301:16	160:12	441:6
412:20	diagnostician	317:14	185:8	443:12, 15
426:23	73:20	346:2	186:20	discordant
development	diagnostics	361:23	187:1	266:5
al 93:9, 22	74:17 189:4	366:17	310:16	271:24
94:1, 10, 18	difference	368:22	417:6, 23	272:22
96:11	160:24	383:20	disagree	277:10
98:17	165:21	393:7	47:23, 24	discover
187:15	216:17	411:7	48:2 132:4	105:15
188:6, 10, 14,	234:5	430:18	138:10	Discovered
16 189:24	300:8	442:8	141:4	43:23
190:1	301:20	differently	142:9, 25	discovery
231:25	differences	344:6, 11	144:11	89:20
232:3, 7	165:15	difficulties	146:2	90:10, 12, 13,
311:9	197:5, 13	368:23	153:11	16 176:7
deviant	199:1	difficulty	180:25	215:22
190:9	294:1	155:22	227:5	discredit
diagnose	343:17	dig 428:15,	254:3, 18	213:4, 5
66:14, 19	431:2	20	255:1	283:23
72:6, 7	different	Diplomate	280:7	discredited
73:5 74:16	26:8 27:15	1:16 445:2,	293:11	283:22
192:6	34:14	16	294:16	discuss
195:12	38:12	DIRECT	343:10	184:2
427:12	53:20	12:1 198:5	349:20	262:12
diagnosed	79:14	312:3	372:9, 22	369:16
69:7, 10	110:13	370:24	375:13	433:6
72:16, 22	123:7	371:18	376:15	discussed
77:1, 2	124:14	397:25	disagreed	108:9
diagnosis	127:5	402:6 408:6	349:22	219:7
69:14	138:25	directed	disagrees	267:7
72:14, 24	184:14, 21	365:18	142:20	362:15
73:17, 24	188:21, 24	directly	143:13	discusses
77:7, 14	189:6, 9	105:2	153:3	323:3
139:17	191:4	187:12	288:9	Discussion
191:17, 20	192:14	197:2		322:6

357:17	displayed	219:5	27:13 28:3	Dolutegravir
413:19	75:12	246:14, 24	38:8 76:22	25:17
disease	dispute	257:4	226:25	domain
170:9	109:21	264:14	documents	316:19
196:10, 11	disputing	278:20	17:8	433:14
276:8, 12	109:23	279:11	143:24	dopaminergi
343:15, 18	disruption	290:18	144:22	c 39:6
360:3, 5	193:22	295:4, 14	145:8, 11	dosage
379:24	399:9	299:1	161:23	294:11
396:12	415:23	305:14	162:4, 10	dosages
397:20	disruptions	308:11	290:4	288:4
402:8	9:3	312:25	331:15	292:12
427:12	distilled	316:6	332:6, 13	345:18
diseases	49:14	332:17	337:19	431:1
170:11	distribution	353:22	doing 15:21	dose 252:6
309:12	238:8 241:7	354:9	25:7, 13	274:11, 15,
310:5	distributions	364:24	29:16 35:2	22 275:5, 7
392:7	238:6	365:7, 10	36:2 38:19	280:16
395:6	DISTRICT	370:1	40:13 47:6	285:22, 25
396:13	1:1 11:12,	381:21	51:19 55:2	286:2, 5, 12
408:16, 17	13	405:24	70:15 71:6,	287:1, 2, 7, 8,
dislike 67:8	disturbing	429:8	12 89:16, 25	15, 20, 25
Disorder	436:12	doctorate	90:2, 25	288:8, 13, 14,
8:23 9:3, 5,	divide	14:6	91:7 171:6	17, 19, 23, 24
13, 19 10:13	287:5	doctors	172:6, 9	289:11, 17
22:10	345:25	14:14, 15	195:7	290:24
25:12	djash@duan	DOCUMEN	204:7	291:2, 22, 23
26:12	emorris.com	T 1:5 62:9,	207:18	292:6, 8, 15
73:13	6:2	25 63:7, 10	208:2	293:4, 6, 9,
309:13	dkatz@smith	76:24	268:18	17, 19
310:6	sovik.com	279:12	273:11	307:18
396:16, 19	6:7	280:1	281:15	354:22
398:8	dlee@btlaw.c	286:20, 23	287:11	355:7, 12
399:6, 9	om 4:16	288:18	318:23	385:23
416:10, 16	Doan 9:5	313:9	349:14	dose-
disorders	131:10	315:4	359:19, 20	dependent
156:15	D-o-a-n	316:21	387:23	249:14
310:2	131:10	338:8	403:24	dose-effect
396:20	doctor 14:5,	349:11	421:15	240:16
413:24	8, 10 21:8	385:9	440:14, 21	dose-
414:4	64:9 66:21,	413:8, 10	443:12	response
415:13	23 116:3	422:13	446:8	229:8
416:1	150:10	documented	Dollar 5:9,	345:15
417:24	214:22	26:17	10 6:4	

dose-responsive	Dr 14:4	207:3	352:17	18 444:2
132:8	23:10, 14	209:6	354:6, 10, 14,	draft 19:2, 6
249:22	25:3 32:12	210:25	23 355:6, 11,	drafting
doses	57:6 60:23	212:25	23 356:18	324:16, 19
289:16	64:21 67:1,	213:2	357:7	draw 39:1
292:10	2, 5, 8, 11	222:11, 22	359:2, 5	70:12 93:6
293:11	68:9, 20	226:4	360:7	230:6
354:16, 20	72:21 79:2,	230:15	361:13	300:13, 25
355:25	9 82:19	232:21	364:10	301:5, 8, 24
357:9	85:8 86:17,	233:6	365:13	355:4
dosing	24 89:13	235:3	366:16	411:24
214:16	91:12 96:9	240:2	367:10, 24	drawing
290:23	112:7	242:9	372:23	411:18
294:8	115:19	244:4	373:1, 6	drawings
double	116:9	249:6	374:12	300:6, 20
231:16	118:23	250:25	375:7, 8, 20	drawn 39:7
232:9	125:5	252:20, 25	376:1, 4, 11,	82:9 87:10
double-blind	127:4, 14	254:22	15, 16	drew 369:6
44:22	128:21	255:2, 10, 18	377:20, 23	drinking
46:13	129:18	256:7	378:6	362:17
47:13 49:5	130:22	258:17	380:20, 24	drive 393:10
166:3	133:19	262:7	381:4	driving
double-blind	138:2, 5, 10	266:24	382:13	248:9, 10
164:7, 21	139:11	272:25	383:16	drug 25:24,
165:1	140:6, 21, 25	273:7	385:3	25 35:3, 14
double-blind	141:7, 8	274:3	386:13	43:22, 24
46:15	143:23	275:10	387:22	45:8 47:20
double-check 26:2	146:13	276:7, 9	400:20	49:20
doubt	148:11	278:12	401:16, 20	94:25
336:21	149:22	281:17, 21	403:13	126:12
DOVEL	151:6	285:3, 17, 23	404:10	152:1
4:1, 4	153:20	286:24	409:12	153:10
downregulat	155:8, 18	288:7	419:19	160:6
ed 431:14	158:23	309:5	423:23	166:11
downregulat	161:1	311:5	424:3, 14	204:19
es 430:21	164:18	314:10, 14	425:12	279:24
downregulati	167:5	326:2	426:8	291:1
on 406:8, 20	186:6, 18	327:18	435:14	292:17
downstairs	187:12, 20	329:25	438:3	332:14, 18
346:4	188:9	330:14	439:20, 21,	350:6, 10, 21
	194:13	331:1, 11, 15,	25 440:3, 13,	351:1
	200:22	25 341:2	20 441:2, 5,	drugs 43:21
	205:15	343:3	9, 22 442:14,	46:1, 10
	206:15	348:7		48:4, 22

49:1, 2	185:6	educated	82:21	embryology
67:17	188:19	157:25	187:9	173:17, 21
69:20	206:6	education	197:22, 25	174:3, 4
70:24	256:10	156:3	200:3	embryonic
71:15, 18	342:8	225:19	211:7	115:23
166:7	346:8	effect 19:22,	280:16	embryos
DSM 73:6	348:8	23 20:3	376:19	328:7
74:21	358:7	22:1, 2, 6, 10	393:25	employee
DSM-5	369:24	36:4 38:17	Egypt 76:22	442:6
397:1	370:12	39:3 44:23	eight 22:22	445:10, 11
DSMs 77:9	410:19	45:2 57:24,	251:19	employment
DUANE 6:1	427:25	25 59:13, 18,	385:4	168:13
due 336:24	429:24	20 68:3	either 28:1	employs
duly 11:21	431:4	73:22 74:3,	179:2	15:3
445:4	435:9	5, 7 83:25	194:25	encounter
duration	440:4	85:6 88:4,	199:10	278:22
274:11, 14,	443:17	21 89:8	214:21	encouraged
16, 22 275:5,	early 19:11	92:13	233:10	218:11
6 365:5	20:5, 9	143:5	291:22	ended
385:11, 15,	21:6 22:21	197:7, 11	325:19	148:23
24	23:4 24:5	211:15	402:17	224:25
durations	25:11 43:20	215:14	406:7	239:9
270:25	earnest	221:23	423:17	260:8, 13
dust 411:12	331:12	229:7, 10	434:21	endocannabi
dyad 272:3	easier 244:5	240:15, 25	electrophilic	noid 324:1
dyads 225:8	317:21	247:22	8:14 412:17	325:8, 18
dying	easiest	267:14	eliminated	326:4, 13, 14
336:23	284:22	269:4, 15, 21	249:15	endocannabi
	East 2:23	270:19, 22	ELLIS 5:7	noids 324:3
< E >	4:12, 21	271:2, 9	else's 421:1	endocrine
earlier	easy 158:13	322:2	elucidate	399:8
13:13 24:5	167:9	328:6	163:7 341:7	endorsement
52:17	ecanaan@ksl	379:14	e-mail	121:25
109:15	aw.com 5:13	effective	151:21	endpoint
139:2	editor	43:24	315:25	41:21
148:11, 25	282:22	329:25	e-mails	148:22
154:2	420:17, 20,	effectively	163:4, 6, 11,	186:14
163:19	22	88:22	13	371:8 434:5
164:6	editorial	Effects 8:24	embryo	Endpoints
167:11	261:21	10:6 20:22	19:23	8:21 78:5
169:24	262:4	37:5 38:6	110:7	119:3
172:17	edits 17:3,	42:24 56:7	170:14	187:15
174:9, 23	22, 23 421:2	57:3 58:9	190:5 275:2	188:13
176:11		68:22 74:9		

277:1, 2, 3	393:6	epilepsy	351:14	rm.com
318:7 323:4	394:18	45:5	356:11	2:21
ends 88:5	environment	336:16	382:25	event 19:15
359:1	al 19:22	337:10	estimate	296:6, 21
engage	40:16	epileptic	88:13, 15	297:6, 16, 18,
193:3	51:22 86:1	336:24	89:4 241:4,	22, 23
engaged	94:22	equally	8, 14, 15	298:14
423:13	100:1, 4	241:20	246:9	302:1
England	130:17	equate	estimates	306:11, 22
26:19	200:20	188:3	245:18	333:19
English	271:22	equivalent	et 8:21, 25	357:6
137:4	357:22	164:5	9:5, 10, 14,	events
enriched	358:11	285:24, 25	20 10:3, 10,	37:14
416:9	378:24	286:2, 5	14, 16	148:13
enrolled	379:4	287:7 293:5	115:21	296:10, 12,
46:5	391:23	errata	401:22	19 297:2
224:24	393:18	446:6, 9, 11,	ethanol	326:24
225:5	394:16	14 447:7	299:14	328:11
entire 52:18	415:11	448:1	302:23	eventually
106:18	environment	ERRATA.....	ethical	49:23
249:9	ally 392:6	166:6 329:7	everybody
308:13	environment 448	ethics 49:12	44:7
328:24	s 394:1	10:21	204:13	217:18
423:19	enzymes	error 229:7,	ethnicity	273:10
entirely	288:5	11 272:23	225:18	284:10
89:5 306:6	EPA 51:1,	282:20, 23	etiology	320:9 376:6
entirety	21 294:9, 22,	errors 18:2	409:24	everyday
143:4	23	211:8, 21	415:25	15:2, 4
entitled	epa.gov	212:14	427:6	everyone's
68:4	316:19	221:10, 13	European	68:4
288:10, 11	epidemiologi	espoused	278:22	evidence
environment	c 338:18	285:4	279:1, 14	28:22
130:3	epidemiologi	espousing	EVA 5:12	29:11
138:13	cal 328:14	440:5	evaluated	46:25 47:8,
191:5	epidemiologi	essential	94:9, 17	14, 17, 25
252:14	st 97:8, 13,	156:3 400:4	274:18	48:1 49:11
276:6	25	essentially	278:9	51:3 56:24
277:25	epidemiology	49:24	evaluating	62:7, 15
327:14	87:5 273:9	136:24	40:20	87:18
360:25	340:17	293:10	367:11	101:10
361:3, 4, 5	epigenetic	295:22	EVAN 2:20	102:17
390:15	414:3, 6, 13,	317:12	evan.janush	103:25
392:17	22 415:1, 4	325:11	@lanierlawfi	104:1
		348:16		132:8

151:25	59:24	336:23	23 130:23	195:8, 20
153:9, 15, 18,	74:20	346:8	133:11, 18,	204:17
22, 25	178:19	383:21	22 134:1	411:22
154:18	254:20	396:5	137:25	412:4
155:5, 19	260:1	404:15, 24	139:10	429:12
163:25	273:14	405:2	149:18, 19,	existed
165:5, 7, 25	275:1	427:22	23 151:13	76:19 351:5
169:12, 15	289:23	examples	176:13	existing
181:1, 16	373:12	20:10	179:5	51:3
188:15	EXAMINAT	297:1	196:17, 18	317:10
189:10, 11	ION 12:1	320:24	205:9, 10, 14	344:6
198:6	284:16	430:23	209:16	369:2
206:5	390:23	exceptions	220:23	431:23
207:5, 14	424:1	19:19	222:2, 6, 12	exists 63:16
213:1	440:1 445:4	excess	226:22	103:24
223:1, 3	EXAMINAT	307:19	256:25	104:4
240:3	IONS 8:4	321:4	263:16	expect
252:10	examine	exciting	266:17, 18,	215:21
257:14	38:23	91:4	21 270:1	228:23
260:15, 21	190:22	exclude 80:5	279:8, 12	229:7
261:2, 4	280:4	excluded	295:2	232:14
279:23	examined	97:3, 5, 10,	298:21, 25	241:9
286:16	40:14	14, 16	299:2	249:20
325:7	266:25	excluding	302:2	265:20
329:7	372:1	139:20	312:22	269:22
335:6	Examining	exclusion	314:15	expectation
386:6, 14	10:8 200:3	97:8, 13, 23	315:18	215:18
397:25	example	139:16	331:22	227:11
399:17	20:17	excuse 47:5	332:2	366:8
402:6	26:18	115:14	337:17	expected
408:7	107:22	executive	338:13	237:7
411:3, 5, 7,	165:24	27:5	364:21, 25	420:13
10 427:21	190:21	Exhibit	369:17	experience
evident 62:9	197:6	64:3, 12, 16	370:4, 17	209:10
evolved	199:12	111:21	380:14, 17,	experienced
195:9	213:22	112:6, 8	23 422:13	228:17
ewe 252:11	219:18	116:15, 22	428:5	
exact 74:15	220:2, 6	118:20, 24	EXHIBITS	experimental
93:3	239:16	119:9	8:11 10:17	318:21
155:25	242:15	120:3	65:18	319:9, 14
275:2	247:9	125:1, 2, 6	256:22	392:24
322:3, 15	289:7, 12	126:9	exist 63:19	experiments
exactly	296:17	127:9, 13, 15	76:18	195:7
41:14	304:21	128:17, 18,	164:21	

328:18	265:25	227:1, 13	100:2, 4	
343:20	272:15	229:11	124:15	extrapolating
Expert 8:18	275:1	238:23	132:23	312:15
9:15 16:18	329:5	239:3	158:20	328:24
96:22 97:4,	361:5	251:15	192:21	
6, 11, 16	383:5 393:6	252:4	198:16	extrapolation
114:18	exposome	254:16	201:9	310:24
307:15	392:22	255:8	225:15	
332:20	393:4	258:20	251:17	< F >
333:21	Exposure	259:3	273:24	face 249:11
334:1, 2	8:24 9:5,	264:17	292:11	facet 360:18
426:10	12 10:11, 15	266:1	303:23	facility
443:6	20:20	267:2, 19	345:14, 15,	346:5
expertise	22:11 23:2,	269:15	16 358:10,	fact 39:8
171:23	22 36:4	272:21	11 362:3	67:17, 20
experts	40:16, 21, 24	274:6	390:14	69:19 82:6
108:2, 5, 6, 8,	41:19, 22	275:8, 17	391:24	139:9
12 111:2, 10,	43:4 45:20,	278:10	392:25	145:12
11 174:24	25 63:19	279:25	393:12	162:8
175:8, 17	78:14, 15	280:4	417:21	216:1
207:20	84:13	291:3, 4, 9	expression	243:9
208:10	88:20 89:3,	306:25	10:1 123:6,	249:23
293:8	7 98:13	307:3	11 124:1	261:14
294:17	100:12, 18	324:11	135:1	281:22
372:19	101:6	339:24	136:1	305:8
376:7 421:7	102:5, 23	346:2	198:20	318:17
expert's	103:21	347:10, 15	303:22	324:11
114:4	104:14	357:16	405:8, 14	370:9
expires	105:5, 17	366:9	406:9, 17, 20,	384:13
447:17	124:23	367:22	21 430:24	427:16
explain	137:3	370:14, 25	extension	factor
171:10	138:14, 16	371:19	315:25	235:1, 2, 8,
391:17	164:19	372:3	extensive	20 283:13
explained	182:18	374:4, 22	151:24	293:13, 21,
315:12	183:21	385:25	extensively	23 294:5, 7
317:25	200:2, 12, 18,	390:18	315:9	307:1
explains	20, 21	402:17	extent 73:14	328:25
277:4	201:10, 11,	406:7	extrapolate	360:10, 12
exposed	12, 14, 15	exposures	249:8	367:20
23:4	203:25	20:5, 9	310:22	factors
210:13	204:2	22:21 28:7	extrapolated	79:14
223:23	210:14	48:18 85:9	311:14	191:2
226:16, 18	224:17	86:1 94:9,	extrapolates	271:17, 18,
251:9, 19	226:25	18, 21, 22	311:5	23 358:6, 14,

15 360:5	fairness	Family 5:10	143:13, 15,	feel 133:15
373:9, 20	192:22	268:3, 7	24 144:17	150:13
374:14	fall 166:3	270:21	145:5, 9, 11,	169:16
375:10	222:25	400:3	13, 20	421:22
376:18	false 89:20	405:17	149:24	feelings
377:6	90:10, 12, 13,	far 16:2	151:20, 21	282:11, 14
378:25	15 215:21	17:22 49:8,	152:18	feels 209:3
facts 228:24	409:16	22 57:3	153:2	fell 237:23
283:2	familial	70:3, 10	154:1, 4	felt 113:23
factual	373:9, 20	74:9 76:20	285:23	female
60:22 148:8	374:14	88:12	289:3	211:12
faculty	familiar	96:15, 19	291:21	214:3
33:10	24:19	122:4	332:18	females
fail 446:17	28:15 45:7,	130:1	334:5	213:17, 21
failed	18, 19 50:25	144:22	338:2, 18	Fetal 146:9
151:25	52:3, 7	167:17	339:22	155:2
153:9	60:9 61:23	195:23	342:10	157:8, 11
failure	73:6, 25	201:9, 23	343:25	203:18, 25
287:24	76:23	202:3	344:6, 17	204:1, 11
fair 16:13	80:20, 24	203:3	348:9, 13	321:12, 17,
19:24	81:11, 20, 24	228:13	349:14	21 322:13
20:18 23:7	82:5 83:22	233:8	FDACDER0	329:9, 10, 11
40:17	145:23	247:4	00145 10:7	330:24
72:17	146:5	273:24	FDACDER0	370:24
149:2	148:21	280:16	00301 10:7	371:18
185:24	175:11	321:14	FDA's	fetal-
186:4	180:1, 18	370:13	154:8	developing
202:10	184:8	371:10	331:16	378:19
204:13	217:2	383:4	337:19	fetus 109:6
205:21	222:17	384:21	339:18, 21	110:6
225:10	250:8	424:5	features	252:16
243:19	278:25	farther	26:7 396:22	308:2, 5
263:2	279:13	237:6	February	330:23
296:8	314:25	fashion	10:4 351:5	fetuses
309:17	315:14	390:4	federal	328:7
343:12	336:13	father	394:3, 7	fever 24:2
350:12	339:20	358:23	399:3	83:10, 12, 22,
379:2	348:18	359:25	404:11	23 84:3, 9,
429:18	351:4	FDA 52:1,	418:16	12 85:4, 7,
fairly	364:12	10, 12, 20	federally	12 108:23
166:10	368:9	53:17, 23	406:6	110:1, 2, 3, 9,
204:15	372:16	54:2, 4, 8, 11,	feedback	16
379:23	394:19	15, 20, 25	317:24	fevers
	419:20	141:22	319:4	109:2, 10, 15,

18, 23	363:16	441:2, 5, 9,	251:6	flagged
110:19	380:5	22 442:14,	282:23	152:11
215:12	418:5, 6	18	291:10, 13	Flip 302:13
field 38:9	419:6	Finnell/Cabrera 388:5, 7	295:19	410:20
47:17	420:5, 9	389:8	297:20	438:14
142:5	423:14	Finnell's	303:12	Floor 2:23
421:7 422:3	429:16	41:9	306:11, 22	6:18
figure	431:2, 14, 19	389:16	315:17, 24	Flower 6:18
247:1	finding	424:9	332:12	FM01
303:3, 7, 20	16:12 88:3	FIRM 2:20	343:8	430:19
304:17	102:22	95:11, 12, 25	359:5	FMO1
305:5	113:22	148:6	369:22	430:16, 21
353:19	220:7	firms 95:14,	370:20	focus 16:1,
395:14	221:11, 20	17, 19	375:6	8 73:12
file 106:7,	330:1	first 11:21	383:23, 24	158:20
15 171:8, 16	findings	14:17	388:4	focused
filed 106:11	215:16, 19	19:13, 21	413:24	189:14
files 443:9	219:9	22:17	427:23	200:23
fill 326:1	221:7, 15, 16,	24:11 25:1	firsthand	focuses
428:17, 24	17 283:22	33:13, 16	315:15	393:25
429:1	340:14	34:22	442:17	FOERSTER
filled 429:11	350:6, 14, 22	40:13	first-in-	5:22
filter 406:18	finds 87:22	42:13, 16, 19	human	folate
final 284:4	fine 86:9	43:3, 12, 21	286:12	400:18
finalized	150:18	47:4 51:16	287:12, 13	415:2
339:19	220:4	57:8 59:5	288:25	folates
financial	320:13	76:25 77:3	292:6, 7, 21	400:3
168:5	finger-	86:7 95:6,	293:22	folder
financially	pointing	8 113:2	294:7	289:25
445:12	254:23	117:2, 5	first-line	Folic
find 90:11	finish	118:25	43:21, 25	399:21, 22,
93:21, 23	208:24	121:2	44:8	25 400:1, 5,
131:1, 17	finished	129:4	five 12:12	8, 22, 24
134:19, 20	365:8	154:1	25:4 34:25	415:3
154:7	Finnell	195:6	35:7, 8	follow
196:13, 14	117:20	200:13	36:21, 22	38:18 85:6
218:19	389:14, 22,	201:2, 20	323:21	296:12
229:7	23 400:10	202:14	353:19	345:9, 11
277:19	424:9, 11, 15	203:3	379:8, 12	followed
278:8	425:12, 18	220:9	380:1, 12	35:9, 11
283:8	426:8	223:13	387:12, 13	42:20 45:3
293:16	436:5, 23	231:24, 25	five-minute	46:5
312:4	438:5, 17	239:8, 16	387:5, 10	169:17
341:15	439:20, 21		fixing 265:2	

374:2	141:5, 19	425:4, 15	311:21, 24	257:3
397:10	144:12	428:19	325:6	279:16
following	145:1	429:4, 14	330:20	299:1
30:15 75:2	146:23	433:20, 25	340:19, 23	314:14
77:7, 16	183:23	434:1, 18	356:22	332:1
155:24	190:14	435:7	381:11, 12,	364:24
203:24	261:13	436:9, 18	17 429:2	370:4
258:10	268:22	438:9, 20	430:2, 4	380:24
321:15	284:7, 20	439:4, 14, 19	foundation	391:8
follows	335:2, 18	440:7, 11, 15	216:10	frontal
11:25	336:25	441:12	four 12:12	26:23
259:19	338:6, 22	442:16	190:8	Frontiers
335:11	340:12	447:6	200:15	414:4
350:19	341:8, 13	formal	275:12	Frontopariet
374:23	342:13	151:23	fourth	al 10:13
follow-up	344:8	153:7	270:5	fruitful
35:22 36:8,	347:5	formatting	365:25	379:13
10, 11	353:9	260:6	Fox 1:13	full 84:12
176:10	374:18	forming	2:3 6:22	233:6
352:21	376:8, 13	87:14	framework	fully 35:11,
353:16	378:1, 21	formulated	327:23	13, 15
food 166:14	379:15	206:1	free 150:13	335:23
332:14	382:7, 17	forth 15:11	253:17	383:9
400:25	384:2	18:20 20:2	frequency	384:16
footnote	385:21	445:8	385:24	fun 29:17
119:6	390:3	fortify	frequently	408:14
forbid	392:14	400:25	287:23	412:9
436:4	394:5	forward	front 64:9	function
438:16	397:23	97:9	70:22 71:3	9:9 27:5
foregoing	400:13	found 12:14	112:8	89:15 224:6
445:6 447:4	401:10	50:19 65:2,	125:5	functional
forget 244:9	402:3	7 92:12, 13	127:15, 16	69:1
forgot	403:8	101:10	128:22	190:11
437:20, 22	404:6	102:16	130:15	198:19
forgotten	406:11	113:19, 22	133:17	392:4
437:23	407:5, 14, 24	124:24	134:2	functionally
Form 23:18	409:18	197:10	136:13	416:19
67:15	411:14	209:11, 13	149:22	fund 394:12
81:23	414:16, 24	252:23, 25	177:25	funded
96:16	415:18	258:19	180:18	25:19, 21
97:19	417:18	259:2	181:24	35:22
103:2	421:14	267:1	205:14	53:10
104:17	422:21	270:9	222:12	71:10, 14, 17,
106:23	424:18, 20	282:19	253:1	

19 404:11	gene 9:3	358:12	123:3, 16	357:22
443:14	10:1 75:10,	375:15	124:18, 19	358:21, 24
funding	14, 19	398:4	125:10	359:3, 6, 14
53:13, 14	120:22	generally	126:19	360:5
71:9 84:20,	122:17	14:18	128:3, 14	373:8, 20
24 394:23	123:2	19:14	129:8	374:13, 25
418:9	129:19	30:14	132:22	378:24
funds	130:3, 6, 17	44:13	133:1, 9, 23	379:4
393:17	133:8	59:13	134:7, 9, 13,	416:9
furan 10:2	135:7	82:17	23, 24	419:13, 15
61:19, 20	136:5	89:14	135:14, 17,	genetically
298:5	137:2	90:22 91:7	19 136:2, 7,	76:10, 15, 16
299:8	178:3, 4, 6	99:5	16 137:8, 9,	276:11
302:24	198:20	121:19	10, 12	geneticist
further	277:25	123:25	138:13, 22	31:10, 11
18:9 49:14	303:22	163:10	139:1, 3	66:23, 24
59:7 137:6	380:8	166:5	395:6, 23	72:13
241:12	390:15	188:8	402:13	271:6
341:6	392:16	190:2	403:1	389:17
383:17	404:18, 24	192:19	404:13, 16,	geneticists
440:1	405:17	264:24	17, 20	121:19, 20,
443:25	409:13	268:12	405:17, 21	21
445:6, 8	427:23	269:22	406:1, 3, 9,	genetics
	430:10	273:3, 20	15 409:24	31:8, 22, 23
Furthermore	431:5 432:3	282:4	416:6, 15, 16	32:1 34:9,
374:24	GeneCards	283:4	419:14	10 66:8
	178:11	296:12	427:5, 17	122:16
< G >	gene-disease	340:4	429:21	138:8
GABA	392:2	351:23	430:4, 17	140:5, 16, 17,
432:25	gene-drug	352:4, 7	431:13, 15	21 170:5, 6,
433:1, 2, 6	409:13	362:16	genetic 31:4,	22 265:8, 10
gamble	Gene-	398:5 399:5	5 66:16	271:7
336:22	Environment	generate	72:5 74:25	359:9
game 208:9	8:21 139:7	329:11	121:22	361:2
gap 325:24	gene-gene	generation	132:21	390:4, 6, 10,
428:17	139:7	303:16	138:19	16 395:21
gaps 51:6	General 6:4	321:3	139:21	418:23
310:11	33:12	431:21	140:1, 3	423:17
311:24	137:22	Genes 8:24	170:7, 19	genome
325:23	147:15	76:3, 5	223:12	72:11
326:1	200:18	117:5	265:20	genome-
gather	207:21	120:11, 17,	271:11	wide 134:24
199:25	208:4, 11	24 121:14	276:8	Genomic
	221:6	122:4	327:14	8:21 119:3

genomics 198:20 418:24	global 10:1 166:10	147:16 150:20, 22	47:18, 19 61:3 65:17,	302:1, 5, 16 315:13
genotype 138:15 395:23	glucuronide 242:16 244:15 250:1	155:10 163:18 166:18 168:7	19 82:24 84:20 86:5, 20 91:10 100:9	318:5, 6, 11 324:20 326:3, 11, 18 327:7
genotype-phenotype 395:19	gluta 416:7 glutamate 415:23	194:25 202:11 220:21	103:17 111:8 117:12	337:25 338:3, 4 343:1
genuinely 282:16	glutamatergi c 416:7 432:21	236:7 240:13, 20 242:8	131:17 132:11, 12 134:18	351:11, 22 353:20 354:9, 19
gestation 21:20 22:14, 22	glutaminergi c 416:20	244:12 273:24	141:13 150:14 155:10	364:16, 19 365:3 369:21
getting 166:16 330:22	glutathione 56:19, 21 57:5, 8, 19	274:13 282:17 284:15	167:8 168:10 169:5	370:17 371:24 379:16
Gilead 26:2	58:5, 6, 16, 18 59:1, 10,	293:1 313:19	174:22, 25 175:13	386:18 387:1, 4
girl 214:15	14 60:16, 18,	314:1, 25	176:3	395:2, 4
girls 214:24	25 61:2, 7,	346:3	180:16	398:17
give 12:15, 23 74:14	10, 14 64:1 115:22	365:6 377:21	181:19	399:10
152:5	250:4, 6	387:10	184:17	401:11
213:3	295:22, 25	391:14, 15,	185:10	410:3
214:16	305:9	16 394:14	189:13	412:14
302:6	306:4	396:5	197:17	419:25
312:3	307:6, 17, 19,	402:20, 21	200:7	429:10
320:24	24 321:3, 4,	408:14, 22	201:18	430:14
346:6 348:2	7 328:1, 9	410:1	202:11	442:5 443:3
given 99:19	329:10, 16,	412:6	204:24	GOLKOW
100:11, 16	23, 24 330:7,	413:6	207:13, 25	1:21 7:2
107:9	8, 15, 20, 24	414:2	208:14, 16	11:3
133:8	glute 432:20	415:14	214:14	Good 12:3,
313:10	go 32:14	416:22	222:13	4 13:16, 17
423:6, 10	52:20	goes 202:1,	229:13	47:1 90:19
432:8 447:5	64:17	4 217:24	235:13	110:19
gives 410:13	65:21 66:1,	296:5	238:10	196:1
giving 239:10	8 96:17	321:10	240:20	230:16
293:10	102:17	383:11	244:5, 7	256:2
437:9	112:6	425:10	245:6	285:5
glasses 413:14	120:14	going 12:15,	246:16	320:16
	124:13	23 20:11	253:1	335:4
	136:5	28:24 30:1	299:12	347:1, 7

354:18	grounded	guest 32:15	HAILEY	352:24
413:15	147:14	420:20, 22	3:4	353:3 363:3
gotten	grounds	guidance	half 22:22	happened
378:17	272:23	154:10	212:23	35:7 103:9
governing	group	157:23	227:12	175:14
389:5	57:10 87:3	285:24	228:9	220:18
government	117:22	286:11	half-life	281:22
217:7	142:18, 19,	288:15	223:21	282:1
316:2	20, 22, 23, 25	289:4	224:4, 6	334:23
394:3, 8	172:23	291:22	227:9	353:1
399:3	219:23	292:5, 20	237:1	happens
404:12	237:23, 24	294:10, 22,	252:1, 5	197:17
418:16	238:3, 11, 14,	23 309:9, 10	302:25	201:10
governmenta	22 239:2	348:14	303:19	happy
l 316:6	243:10, 14	guideline	304:4, 18	207:20
grad 41:2, 8	276:16	291:6	half-lives	208:9
42:5, 9 44:6	282:7	311:9	249:25	283:8
graded	381:11	345:10	252:7	309:11
421:6	412:17	guidelines	halfway	312:7 391:6
gradient	grouping	139:18	233:18	hard
362:23	238:18, 21	179:14	373:15	111:16
graduate	groupings	187:8, 17, 18	hand 12:22	355:14
34:15, 16	237:13	192:4	364:17	harm 147:7
40:22	groups 57:4	309:2, 19, 24	handbook	harvested
42:12 85:2	221:12	310:25	70:3	224:25
173:25	237:20	345:9, 12	handed	225:4
Grand 3:12,	238:1, 4, 13	Gustavson	18:12	hazard
17 254:14	295:24	9:20	112:20	267:21
255:6	296:1	266:14	114:9, 24	268:1, 4
grant 36:8,	346:3, 22	267:5, 13	115:20	270:14, 22
12, 17 40:5	growing	269:4	155:14	440:10
71:3, 14	153:25	276:16	324:23	HEACOX
grants	154:17	277:4	handle	2:22
394:11	155:5 206:5	280:13, 22,	314:1	head 50:6
great 414:21	Guaynabo	23 281:2, 23	Hang	71:2
greater 88:8	3:7	283:2, 6, 15	436:17	155:16
GREG 4:4	GUERRA	284:3	happen	172:20
greg@dovel.c	3:1	guy 416:24	197:17	212:9
om 4:4	guess 37:16	gynecologist	200:12	272:8
grooming	63:18	173:4	203:18	300:10
193:6 199:9	84:21		321:11, 12,	headache
Ground	195:25	< H >	17 323:24	37:15
148:7	335:22	HAIGHT	325:13	headlines
		6:14		218:23

Health	140:21	223:1	408:20	26:4, 6
25:22, 23	322:6	230:15	412:14	27:2 28:10
52:21, 22, 23	help 48:6	high 110:2,	HIV 25:17	30:5 37:12
53:11, 23	150:12	3 165:5, 25	52:19	42:23 43:5,
146:21	229:23	166:4	53:21 71:21	18 44:9, 24
147:1, 25	258:18	238:18	hold 103:22	45:20, 23
148:17	392:23	243:3	168:3	47:2, 14, 25
149:15	393:10	265:17	412:13	48:22 49:4,
156:3	401:9	374:25	Holmes	11 66:11, 18
173:2	helpful	higher	45:11 46:8	67:18 72:7,
216:24	418:5, 6	165:16	home	8 75:16
217:22	431:25	350:5, 20	391:14	77:1, 4, 5
267:3	helping	363:25	homework	101:7
366:11, 13	146:19	highest	421:6	102:6, 24
389:4, 6	hepatic 10:1	49:10	homogeneity	105:5, 18
391:24	hepatocarcin	238:19, 23	368:3 375:1	132:10
393:19, 24	ogenicity	239:3	honors	138:7, 17
394:1, 16, 17	304:4	407:20	389:25	149:3
440:10	hepatocarcin	408:8	hope 214:20	157:11
Health-	ogens	highlight	hospital	158:19
funded	303:25	399:11	229:2, 3, 20	165:1
389:2	Hepatotoxicit	402:10	230:1	170:6, 7, 8
hear 12:8	y 8:20	highlighted	hosted	172:12
49:8 173:5	118:5	157:7	54:18	173:17, 21
191:19	119:2	highly 357:2	hosts 121:6	174:3, 4
218:8	120:3, 5	Hill 41:15	hour 86:5	191:21
441:18	254:8	79:6, 10, 14	227:3, 6	192:21
heard 343:9	405:13	180:8	hourly	193:4, 14, 25
397:14	hereinbefore	234:19	167:14	196:6, 10, 11,
435:18	445:8	235:23	hours	13, 18
441:10, 14	Hernandez-	Hills 6:13	167:19, 20	197:18
442:13, 17,	Diaz 45:13		227:9	200:10, 12
22	46:9	hippocampal	251:19	201:15
heart 94:7	hesitancy	324:25	252:2	204:4
heavy 40:24	149:8		302:25	209:17
41:15, 19, 22		hippocampus	304:20	216:2
56:4 58:11,	heterogeneity	27:19, 21	Houston	222:3
13 77:24	368:7, 11	28:1, 6, 19	1:14 2:6	229:15
85:13, 22	Hey 86:4	324:15	11:9 13:9	250:11
306:23	284:12	hired 98:15	93:16 95:3	266:9
307:2	Hi 387:22	108:6, 8, 12	How's 256:1	274:19
358:10	hierarchy	425:1	human	280:21
held 1:12	163:25	hit 127:3	21:18	285:25
11:9	165:4, 7	397:9	23:11, 16	286:4, 25

287:7, 15, 20	343:21	250:18	66:17	Importance
288:13, 17,	349:6	293:16	418:7 432:2	8:20 119:3
21, 23	356:23	393:4, 9	ignore	important
289:17	368:4	identical	238:11	23:15
291:2, 22	hundreds	196:17	II 208:22	28:18
292:11, 15	120:19, 20		III 3:22	55:21
293:4, 19	HUNT 2:11	identification	Illinois 1:17	108:22, 25
294:11	hurt 67:20	64:4	2:16 445:19	109:1
312:13	Hutson	111:22	illuminating	194:8
323:16	95:22	118:21	274:25	220:23
329:7	hwatts@watt	125:3	immediately	222:23, 24
339:5	sguerra.com	127:10	224:2	236:24
340:23	3:4	128:19	impact 51:4,	268:13
342:4, 11	hydrogen	133:12	5, 7 378:25	269:13, 18
343:15, 18	301:23	149:20	417:21	396:17
347:3	Hyperactivit	205:11	impacts	401:24
350:1	y 9:13, 19	222:7	27:14	421:11, 25
354:25	hyperkinetic	256:23	35:23	422:1
355:13	260:7	266:22	93:10	improper
357:24		279:9	149:15	437:5
358:1	hypertension	298:22	186:23	
360:7	408:23	312:23	232:19	improvement
367:25	409:2, 4	331:23	312:12	277:13
369:2	hypotheses	364:22	324:14, 25	impulsivity
379:14, 24	392:5	369:18	impaired	360:9, 12
391:24	418:8, 9	380:15	327:20	381:5
394:17	426:23	identified	328:20	382:2, 10, 13,
humans	hypothesis	45:1 72:20	impairment	19, 21
24:2 164:7	20:1 88:24	75:18, 22	8:16 309:7	inasmuch
189:12	196:3, 4	78:6 123:8	310:17, 19	87:7 141:6,
192:22	252:20	253:9	318:7, 8, 20	8 175:9
193:9	431:21	274:5	319:8	185:1
196:23	hypothetical	409:13	326:24	188:24
197:3, 7	220:16	identifies	327:4	197:6
198:2	347:1	283:7	329:2	248:4
199:1	hypotheticall	identify	412:20	252:9
204:25	y 220:19	115:15, 17	impairments	255:3
252:10, 22		311:17	309:24	261:25
253:5	< I >	392:23	396:22, 23	276:1
287:6	ibuprofen	402:12	imperative	322:19
294:2	408:11, 14,	443:13	446:13	326:7
307:7	24 409:2	identifying	implication	343:14, 19
328:2	idea 148:21	16:12	139:23	344:11
341:6	162:2			366:6

inaudible	63:23	399:8	indicated	indicating
144:13	156:14	402:15	81:2, 9	250:3
inception	170:6	406:19	126:14	376:22
45:17	225:17	416:17	130:2	indication
include	including	increased	204:5	10:9 74:11
37:11 57:1,	16:15 50:8	38:7, 10	206:4	226:2
7 87:23	160:11	39:9, 11	226:10	228:20
88:1 114:6	250:1	90:15	251:25	400:7
156:20	296:1	136:3	253:17	indications
166:10	302:22	213:12	280:8	84:5, 7
184:23	396:21	221:7, 8	281:6	186:25
185:2, 22	417:25	231:24	286:22	201:5
186:3	431:5	239:21	296:10	indicative
187:24	incomplete	243:21, 25	309:2	27:12
190:9, 12	17:10	246:1, 2, 23	312:6	393:12
225:17	inconsistency	248:6, 7, 11,	330:11	individual
264:23	383:19	18 249:21,	337:4	75:5 124:2
290:15	incorporated	24 254:8	338:11	386:17
319:14	267:6	267:20	355:18	404:24
326:24	Incorrect	276:3	367:13	442:6
345:15	30:21	281:4	368:13	individually
358:9	incorrectly	322:24	371:23	131:20
373:2	44:13	374:9	376:21	133:6
431:10	increase	375:24	378:9	individuals
included	78:11, 15	383:10	382:9	271:23
37:15 62:5	83:13, 15	384:5, 8	402:9	induce 23:9
70:19	85:2 88:8	increases	404:16	41:22 43:5
113:5	98:11	361:8	405:13	44:8 56:7,
124:17	109:10	increasing	407:15	18 57:20
156:18	234:2	83:23 326:7	409:22	68:10, 12
159:1	246:21	independentl	426:6	69:17 81:2,
185:21	249:14	y 51:13	427:25	18 170:13
186:1	260:23	56:2 106:3	440:23	235:4
190:3	261:1	157:17	indicates	322:4
251:16	270:12	235:11	128:12	347:15
261:2, 23	288:5	INDEX 8:1	129:15	induced
302:19	302:24	indicate	130:2, 4	20:13, 16
311:10	328:1	120:6	131:13	356:10
323:20	356:14	126:3	133:7	induces
325:11	360:3, 4	131:11	153:5	35:3 69:16
includes	385:6	138:13	156:4	78:9
16:6 22:12	390:16	186:25	160:5	inductions
27:14 37:8		214:15	310:3	23:16
56:10 58:4		269:9 363:1	405:7 413:9	

industrial	104:18, 23	inhibitors	institutions	129:8
85:18	113:8	52:19 53:22	163:13, 14	134:9, 13
industry	135:22	initial 120:8	388:10	139:1
106:19	143:10, 16	228:12	INSTRUCTI	325:14
in-family	168:5	286:12	ONS 446:1	interacted
281:6	183:8	393:14	instructor	67:4 175:7,
infantile	190:20	initially	32:1	16 250:4
77:10	199:23	35:5 36:24	insufficient	interacting
inference	225:16	44:25 65:7	85:15	63:24 123:7
350:10	231:5	81:1	insulting	interaction
351:1	259:16, 17,	156:13, 21	440:18	27:21, 23, 24
370:23	19, 20	197:8	insurance	51:4 57:4
371:19	264:11	200:21	216:25	76:8 118:6
403:2	340:22	224:13, 14	217:18	123:14
407:7, 11, 21	342:17	227:22	intake	130:18
408:7	343:7	364:8 427:3	354:17	131:14
inferences	350:9, 25	initiate	integrase	135:23
408:20	385:23	297:1, 6	52:19 53:21	139:22
inferred	391:25	injection	integrated	140:4
130:5, 11	397:4	290:15	392:3	154:19
131:12, 13,	422:6	inquiry	intellectual	322:19
20 133:7	431:24	137:21	160:11	326:9
134:12	441:6	insignificant	417:5, 23	331:9
infers	informative	168:18	intended	397:21
136:15	186:10	instance	72:13	400:17
	200:5, 7	78:22	326:17	402:7
inflammation	275:5, 18	102:3	426:22	407:18
303:16	340:10	287:10	intending	415:2 434:4
influence	341:23	instances	38:2 333:8	Interactions
235:9	342:4	100:6	intense	8:23 25:10
265:11	349:8	432:14	423:2	78:25
322:21	380:4, 10	institute	intention	108:2
361:3 393:7	informed	41:11	87:11	120:23
influenced	335:24	393:23	433:16	121:15, 17
392:7	ingest	Institutes	intentionally	122:15
402:16	200:24	25:22	166:7	129:19
influences	ingestion	52:22, 23	169:20, 21	130:4, 6
321:23	201:7, 17, 19	53:11	227:15, 16	131:21, 23
influencing	323:15	389:2, 4	interact	132:9, 21
366:7		393:18, 24	76:6 117:6	133:8
inform 48:6	inheritability	institution	118:11	135:7
350:5, 21	265:14, 17	149:10	120:24	137:7, 14, 15,
Information	Inheritance	163:12	123:3	16, 23 139:6,
10:4	121:24	388:15	126:20	7, 8 178:20

199:2	internal	255:4	69:13	Jim 12:7
277:25	313:5	In-Utero 9:5	143:4	13:10
280:19	319:17, 18	investigating	155:3	64:11 86:4
303:4, 24	337:19	40:7, 10	215:12	111:7
323:23	internally	investigation	270:3	150:5
327:14, 16	348:21	232:23	308:6, 7	207:16
361:11	interpret	investigator	313:2 400:7	437:23
365:16	195:5, 24	42:10	IV 201:5	jj.snidow@k
390:15	interpretatio	388:22, 25	290:12, 21	ellerpostman
392:1, 11, 17	n 159:23,	invite 54:16	291:1, 10	.com 2:15
395:8	24 195:22	invited		jlara@stoned
398:1	interpretatio	24:24	< J >	eanlaw.com
402:11	ns 38:13	involved	J.J 2:15	6:12
405:1	interpreted	8:15 27:4	Jacinto 33:4	jmurdica@bt
408:8	88:17, 19	107:23	Jackie	law.com 4:9
409:13	269:10	296:2	172:24	job 15:2, 4
430:10	interrupt	412:18	173:6	29:21
431:16, 17	207:17	416:7	199:15	389:16
432:3	320:8	424:17	Jackson	390:20
interacts	intersect	involvement	10:2 302:7,	418:4, 17
117:24	390:11	27:7 426:10	9	Johnson
119:10	Interval	involving	JAMES 4:9	4:22 11:24
404:12	10:4 87:25	392:21	January	148:6
interest	88:6, 14	IQ 160:8, 22	10:6	410:5, 12, 13
25:2 94:6	89:4	I-squared	JANUSH	413:3, 5
106:8, 12, 16	211:24	368:14	2:20	425:24
145:19	213:14	issue	Jersey 1:20	435:20, 25
171:6, 9, 12	239:25	148:17	4:21 445:21	436:4
361:15	268:6	151:23	JESSICA	437:1
442:4	383:7, 11	232:1, 4	4:20	438:7, 18
443:11, 14	intervals	233:23	jessica.brenn	JOHNSTON
interested	384:20	341:7	an@btlaw.co	4:10
34:23	interviews	issued	m 4:20	313:25
41:15	209:22	348:13	Ji 9:14	364:18
274:4	210:16	issues 94:1,	222:14	join 207:20
382:16	intestine	3 152:2	236:11	JOSEPH
445:12	201:22	153:11, 16,	237:10	6:12
interesting	202:25	23 154:16,	248:21, 24	Journal
218:19	291:11, 13	20 232:8	250:7	26:19
interests	introduced	352:9	253:9, 19, 25	115:22
443:9	87:8, 9, 12	378:18	254:12	210:7
intermediate	426:14	it'll 83:2	255:2	230:23
s 182:14	introduction	its 22:11	280:17	420:1
		45:17 64:1	331:2	

journals	372:4	434:1, 18	141:12, 24	279:20
218:20	kg 289:13	435:7	142:21	282:10
420:17	kgs 289:13,	440:7, 11, 15	143:3	287:15
JUDGE 1:5	14	441:12	144:22	288:22
235:14	kill 19:23	442:16	146:1	291:19
391:18	kilogram	kingdoms	148:22	293:18
404:3	304:20	197:24	149:3	298:7
judgment	kind 87:9	KINSMAN	152:17	300:8, 11
90:20	102:21	3:16	157:1	308:11
JULIEN 4:3	105:24	knew 44:7,	161:19	312:7, 25
julien@dovel	111:16	11, 21 208:1	162:6, 8, 14	315:4
.com 4:3	198:12	214:14	166:3	316:1, 15
July 150:6	KING 2:10	365:12	168:21, 23,	318:2
151:16	5:12, 14	knockout	24 174:8, 14	319:12
152:18	13:1 64:15	379:12, 22	175:18	320:1, 9
jumped	65:16 66:1,	know 15:7,	178:16	326:6
343:5	5 150:20	10, 20 26:10,	179:12	333:3, 15
June 16:18	256:1	18 45:11, 15	180:16	334:4, 21
jury 391:18	313:16	48:13	181:25	336:3, 4, 7,
404:3	319:23	49:22	188:23	15 337:14,
justify 90:23	320:4, 7, 15	50:22 52:1	207:12	24 338:18
	335:2, 18	60:19 62:2,	208:19	339:22
< K >	336:25	8 65:24	216:25	341:11
Kansas	338:6, 22	67:2 73:4,	217:20	342:15
1:19 3:12,	340:12	14 74:15, 19	224:13, 16	344:10, 17,
18 445:20	341:8, 13	76:20, 25	228:1, 7, 13,	21 346:14
KATIE 6:17	342:13	77:3 79:24	16, 18, 20	348:7
KATZ 6:7	344:8	80:4, 25	229:21	349:20, 21,
KE 295:16	347:5	81:4, 6	230:9, 11, 24	23 351:13
keep 83:14	353:9	82:11, 15, 22	232:9, 15	352:9, 22
99:9	374:18	88:25 96:9	233:4, 8	353:10
318:11	376:8, 13	97:10	234:9, 15	359:4
401:11	378:1, 21	98:23	236:9	361:6
415:7	379:15	106:4, 17	247:4, 8	363:3, 14
KELLER	381:1	107:3	248:21	364:15
2:8 6:23	382:7, 17	117:13	251:2, 8, 18	365:10, 14
KENDRICK	384:2	120:18	257:10	367:19
6:4	385:21	123:1	261:25	368:20
key 21:4	387:12	124:4	262:3, 22	369:24
296:6, 9, 12	424:18	130:1	263:9	372:14, 18
297:16, 18,	425:15	131:5	264:15	377:17, 18
22, 23	428:19	134:21	272:1, 4	387:25
298:14	429:4, 14	136:11	273:14, 25	393:1, 20
	433:20	140:24	275:11	399:22

400:20	KRAUSE	332:20, 25	large	99:6 104:2
408:10	3:16	333:10, 13	170:12	111:13
409:1	Kroger 6:14	334:1	218:16	167:12
410:4, 12	kttrinh@hbbl	335:12	252:17	175:10, 20
411:11	aw.com 6:17	337:25	265:20	424:17
413:2, 4, 12		354:21	271:8	425:12, 14
414:12, 17	< L >	labels	352:19	426:9
417:13	lab 14:12,	292:25	426:9	435:16
424:14, 22,	13, 16, 18	294:13	largely	LAWYER'S
25 426:7	28:15 41:2,	labor	27:15 49:7	10:22 449:1
430:15	4, 9, 11	228:12, 18	94:21	lay 216:9
434:20	108:12	229:18, 25	160:10	layering
435:23	117:20	249:18	193:25	26:21
436:2	167:25	laboratory	346:16, 19	layers 27:15
437:4, 6, 12,	169:23	72:20	385:15	layman's
24 438:3, 15	171:1, 19, 23	107:12, 14,	409:11	267:17
439:16	344:24, 25	20 108:21	larger	lbosso@ksla
440:4, 9, 13,	345:1	170:5	188:11	w.com 5:17
20	388:5, 6	344:4	213:3	lead 42:10
knowledge	389:8, 25	345:11	late 409:5	382:11
130:8	390:3, 20	359:12	laughs	389:1
374:1	392:12	388:8	359:19	401:12
421:12	398:11	389:19	LAURA	417:22
known	414:20	lack 102:22	6:23	leading
43:17 44:2	424:10	147:2	LAUREN	8:16
76:1	label 49:20	221:15	2:14	164:16
110:21	147:2	278:24	lauren.schult	412:20
208:7, 17	156:4	313:14	z@kellerpost	leads 327:8
336:17	289:8	lamb 252:12	man.com	leap 79:3, 5
358:14	290:8, 10	lambs	2:14	learn 20:16
388:1, 21	291:1	252:23, 25	LAW 2:20	378:16
399:4	292:2	253:6	32:15	learned
416:17	293:3	laminal	95:12	378:23
418:22	294:14	27:14	204:16	learning
knows	332:19	Landa	lawful 11:21	8:17 63:1,
106:21	333:16, 22	413:23	LAWRENC	4, 10, 11
229:16	334:6, 22	language	E 2:4	184:24
336:5, 8	337:18	63:1 137:4	lawyer	185:3, 7
356:18	338:1, 10	368:18	147:5	186:19
437:17	labeled	434:3	168:24	187:1, 8, 15
KO 5:1	304:19	LANIER	lawyers	309:7, 25
Kohler	labeling	2:20	81:17	310:16, 17,
151:21, 24	147:20	LARA 6:12	93:15 95:3,	19 318:7, 9,
	156:5		7 98:15	16, 19 319:7

326:25	238:12, 15	limited	listed 57:12	159:8, 12
327:4, 20	268:3, 7	396:21	58:8, 18, 19	219:13, 21
328:20	323:7, 9, 11	LINDSEY	59:2, 4	220:20, 22
329:3	levels 189:9	3:11	61:16 62:4,	233:9
412:21	191:4	line 87:9	13, 16 77:10	285:11, 12
417:11	238:17, 19	127:23	117:11	292:24
leave	307:6 321:7	303:12	123:5, 16	293:1
325:24	Lew 45:11	354:21	128:15	294:13
410:3	LIABILITY	448:3 449:3	259:16	328:14
428:23	1:4 11:11	lines 411:7	295:18	346:13
lecture	207:18	431:1	297:8	409:14
34:10	358:21	link 123:17	298:4	431:24
lecturer	liable 90:11	129:2	299:9, 25	LITIGATION
32:2, 13, 15	liberty	152:1	303:9, 13	N 1:4, 21
34:11	184:2	153:9, 15, 22	305:6, 10	7:2 11:4,
lectures	licensed	154:14	306:14, 17	11 14:21, 25
121:22	66:22 73:8	254:16	listing	15:11
led 36:25	Liew	255:7	303:18	16:17
53:12, 14	259:23	309:15, 21	431:8	43:10
154:24	260:7	406:6	lists 430:17	51:17, 20
348:21	life 24:10	linked	literally	68:1 85:21
LEE 4:15	413:24	309:12	292:9	86:2 92:23
left 17:9	423:13, 16,	310:4, 25	305:12	93:7, 13, 21
92:20	19	lip 20:17,	438:9	94:8, 14, 24
168:22	ligand	24 21:2, 6, 9,	literature	97:5, 17
legal 329:7	303:24	13	29:9, 17	98:16
length	ligands	list 57:17,	30:11, 13	99:24
385:12	302:22	18, 23 59:12	51:20	101:3
lengthening	303:14	60:2, 14	60:12	102:2
303:19	304:17	114:24	61:21 62:4	105:18
lengths	likelihood	117:5	64:23 65:6	106:25
274:6	140:4	129:16	77:8 79:13	111:2
letter 437:7	241:13	130:19	80:8, 12	112:17
letting	likes 435:14	133:22	81:21, 25	143:25
319:25	limit 354:19	136:12	83:23	153:4
leukemia	limitation	161:22	85:12	162:11
355:25	253:10	162:17	91:15, 20	167:17
leukemias	264:3	174:18	108:4	172:12
355:19	Limitations	183:5, 7, 14	109:12	175:8
357:4	253:8	398:14	113:6	179:15, 21
level 46:25	283:25	401:5	136:25	182:17
49:10	285:13	404:18	139:16	289:5
225:19	350:8, 24	405:21	148:12	291:21
236:13	373:3		157:4, 9	337:21, 22

372:20	logical-	111:11	214:2	383:3, 14, 17
424:17	thinking	112:12	216:1	384:21
425:1	229:15	114:21	221:23	390:14
426:11	long 41:6	115:4	222:9	395:2, 4
441:3	43:22	119:17	227:22	403:18
litter 194:20	77:17	121:7, 9	231:11	404:18
little 19:11	99:10	122:24	233:15	406:18
21:5 26:4	166:20	123:17	235:24	408:16
56:5 94:13	365:1	124:3, 8, 13	239:7, 14, 15	413:12
128:4	389:21	125:16, 19,	241:24	418:19
216:10	longer	20 126:9	243:11	419:14
225:5	160:6	127:12, 19	245:16	429:6
229:16	236:25	130:22	246:8	430:12
230:22	237:2, 8	131:15, 19,	258:9	431:8, 13, 16,
245:9	252:1, 5	25 132:17	262:11	17
285:21	260:20, 22	133:5, 14	263:24	looked
295:8	275:7	134:18	269:25	12:13
380:18	longer-lived	135:6	270:2, 7, 15,	30:10, 13
403:18	248:9	136:5, 9, 14	24 272:2	32:4, 10
436:11	249:25	137:6, 7, 8,	280:17	36:1, 4
live 376:3	longest	10, 11, 13, 15	284:23	39:22 40:4
391:11	365:21	140:6	289:8	42:22
liver 120:4	longitudinal	143:24	292:13, 14	77:22
202:1, 6, 8,	9:19	145:21	293:1	79:19, 21
25 253:25	longitudinall	157:21	294:22	80:3 81:13,
254:7	y 155:24	159:21	298:13, 19,	19 85:20, 25
287:23	long-term	163:12	24 313:12	91:14, 19
288:5, 6	149:4	170:25	328:5, 6, 7	114:7, 15, 25
290:11	160:20	172:18, 22	331:7, 13	115:2
291:12, 14	267:19, 24	174:15, 18	338:25	118:5
303:23	366:3, 17	177:20, 22	339:10	119:21
306:5	look 16:14	178:9, 17	340:24	129:11
321:12	25:10	179:24	341:16	130:18
LLC 2:8	35:23 36:6,	181:3, 4, 9,	342:25	131:9
3:1	17 39:20	12, 13 190:1,	345:22, 23	136:18
LLP 4:6, 15,	51:2 56:20	7 191:10, 12,	347:21	141:2
17 5:1, 4, 12,	57:15	25 192:3	349:25	143:17
14, 22 6:1, 9,	59:25 60:4	193:8	353:12	155:10, 11,
14	61:4, 15, 21,	197:21	359:23, 25	12, 13
loaded	24 62:18, 24	198:9, 21	361:11	157:18, 24
148:3	65:1, 19	203:4	367:4	158:7, 8
location	77:24	210:5, 21	369:4, 8, 15	159:8
253:25	80:11, 14, 18	211:2, 10, 14	375:6	161:23
	92:20 98:7	213:20, 21	381:9	172:10, 15

174:9	181:1, 7	322:18	machines	69:2, 22
178:22	187:21	346:15	346:23	93:11
179:7	190:16, 18	393:5, 6	mad 166:16	109:11
189:23	191:7, 10	399:22	maimed	190:10
204:1	193:4	424:15	67:20	354:24
216:11, 13	198:3, 24	435:15	main	Man 121:24
224:7	199:3	lots 300:6	317:23	management
266:8	207:9	Louisiana	410:1	229:4
267:14	212:6, 13	1:13, 19	major 16:3	manifestatio
272:5	223:21	2:5 445:22	44:8 49:19	ns 26:25
274:17	224:14	Love 95:21	68:12, 23	190:8
277:1, 3	230:17	low 157:11	69:21 76:3	manner
280:13	244:21	160:5, 20	94:5 354:24	268:16
298:11	245:14	225:23	majority	273:17
307:21	246:25	238:12, 14	71:25	manual
331:15	247:20	242:22	123:23	392:21
337:19	279:20, 21	252:6	196:9	manually
365:15	303:11, 15	408:21	201:13	391:25
367:1	304:24	lower	254:5	manufacture
370:7	305:2	270:25	347:18	r 161:24
381:20	324:12	321:7	350:16	manufacture
416:14	327:15	lowered	379:5	rs 106:19
421:1	334:13, 19	90:1	384:14	marble
422:24	342:9	low-	390:5	193:13
427:4	390:13	molecular-	430:10	marbles
430:5	393:11	weight	making	192:23
433:7 434:8	415:2	302:22	42:23	193:6 342:9
looking	Looks	lscarcello@w	196:11	March
36:15	205:24	cllp.com	262:18, 25	349:13
38:19	220:13	3:11	335:24	margin
40:23	300:12	ltracey@trac	401:12	307:19
41:12	303:21	eylawfirm.co	male 211:12	mark 64:6,
48:11 70:7	316:3	m 2:5	males 210:8,	18 112:5
71:4 90:9	Los 4:12	LUKE 5:17	12, 21	115:24
93:8	6:18	lump	211:14	118:18
114:17	loss 277:9	273:20, 25	212:6	124:25
118:7	lost 352:20	lunch	213:15, 17	127:13
121:17	353:16	155:11	malformatio	128:16
132:12	lot 51:10	163:18	n 24:9	149:17
158:12	120:16, 18	166:13, 21	49:19 94:6	205:8
163:3	124:2	167:4 315:7	malformatio	242:6
164:1	189:14	LUNER 4:1	ns 16:4	266:17
178:11	273:15		20:7 44:9	312:20
179:6	314:17	< M >	68:12, 15, 23	

364:16	108:23	mcharchalis	meaningful	measuring
380:22	146:9	@btlaw.com	87:1 89:12	347:2
marked	155:2	4:11	90:7, 8	371:10
64:3	190:22, 23	MCL 12:15	275:14	mechanism
111:21	191:1, 5	mcwatts@wa	means	200:6
118:20, 23	209:21	ttsguerra.co	180:24	253:2
125:2	225:17, 18,	m 3:3	195:23	310:11
127:9, 15	19, 22 231:7	MDL 1:3	309:9	323:3
128:18, 22	233:15	mean 17:5	389:1	324:9
133:11, 17	235:5, 8	38:11	393:1	340:18
137:25	253:13	39:12	401:21	mechanisms
149:19	345:20, 21	51:22 74:2	411:6	320:21
151:12	351:19	84:18	meant	372:1
205:10	352:2, 4	88:22	238:18	392:6 433:3
222:6, 11	358:17, 21	106:13	measure	mechanistic
256:23, 25	374:4, 8	108:6	193:18	131:14, 21
266:21	382:3 386:7	131:24	239:11	137:14, 16
279:8, 11, 19	Maternal-	179:16	244:14	311:18
295:1, 2	Fetal	184:11	311:8	342:23
298:21	108:18	185:5	Measured	372:11
312:22	146:7	209:19	10:11	397:25
314:15	157:20	245:3	226:11	402:11
331:22	173:2	262:11	243:12	431:17
332:1	math 225:7	268:23	244:17	mechanistica
364:21, 25	287:4	273:13	245:11	lly 416:19
369:17	matter 11:9	282:15	251:1	Meconium
370:4	113:21	289:6		10:12
380:14	166:6	295:24	measurement	230:16, 19
428:5	221:19	307:12	237:11	262:10
429:22	334:11	318:15	238:25	264:11, 17,
marker 63:5	336:12	327:12	253:11	19, 22
market	358:23	333:25	measurement	369:23, 24
110:11	399:15, 18	347:6	s 225:13	370:15
match 262:2	matters	350:22	237:14	Media
material	47:12 48:1	369:4	239:8	86:15
261:16	Matthew	379:14	370:24	151:4
materials	13:20, 21	393:3	371:18	167:2
126:10	maximum	397:20	measures	255:16
129:25	289:17	403:10	16:13	314:8
332:9	291:2	411:6	139:19	354:4
maternal	293:4	416:13	203:23	387:19
33:6 83:10,	307:18	427:19	242:10	Mediated
12 84:3		438:9	367:6	10:13
85:2				

mediating	388:12, 14	mention	82:6, 21	metabolites
372:2	389:9	126:11	85:13	227:20, 22
medical	435:24	135:4	296:23	236:19, 25
14:6, 8, 9, 10,	436:3	302:17	306:25	237:7, 12
15 31:3	438:4, 16	324:2	413:17	242:10, 16
34:12, 20	443:19	370:13	415:11	245:11, 14
66:21, 23	meet	403:19	mercury-	247:2
72:13	420:12	415:22	containing	248:3, 5, 10
141:1, 15, 25	422:7	416:6	79:24	250:1
146:11, 16	meeting	429:2 430:4	mere 308:7	251:24, 25
157:23	9:22 53:2,	mentioned	messenger	252:13, 23
158:2, 4	3, 18, 25	22:25 50:4	405:8	253:20
173:24, 25	54:21 55:4	51:21 56:4	met 13:22	metabolized
388:20	73:23	120:8, 12	45:14	202:8, 25
398:5 403:5	meetings	139:2	53:22	254:7
medication	174:24	157:19	389:23	305:8, 20
36:1 37:18	meets 422:2	160:21	meta-	330:23
110:13	member	276:5	analyses	metabolomic
223:9	24:12, 16, 17,	294:21	219:15	s 38:20
226:2	18, 21	326:22	363:18	198:21
228:14	180:12	339:1	meta-	metal 41:16,
251:6	182:1	342:3	analysis	19, 22 56:5
291:10	memorize	343:16	30:23	306:23
335:1	182:3	366:24	49:14	307:2
336:18	memory	367:7, 21	165:9	metals
medications	8:17	371:12	219:17, 22	40:24
48:7 53:20	273:12	389:12	220:10, 14	58:11, 13
219:20	309:8, 25	395:15	363:11, 12	77:24
225:15	310:18, 20	405:4, 19	368:5, 17	85:13, 23
336:17	318:8, 9, 16,	443:17	369:2, 10, 12,	358:10
337:5, 7	20 326:25	mentions	14	Meta-
358:8	351:20	303:2	metabolism	regression
361:25	412:21	413:10	39:5 64:2	362:25
362:3	417:11	431:6 434:7	202:4	363:5
Medicine	Mendelian	mercury	203:4	meter 294:1
15:5, 6, 10	121:24	56:6, 9, 18,	254:1	method
26:20	395:21	21, 25 57:11,	294:1 416:8	290:19
108:18	Mental	12, 20 58:4,	metabolite	419:11
146:7, 9	25:23	8, 19 59:5,	236:12, 22	methodology
155:2	182:17	21 62:7, 11,	238:20	126:2, 7, 15,
157:20	183:20	15 63:17, 21	243:17	17 136:15,
214:13, 19	184:14, 18	64:2 78:4,	244:16, 19	19 176:17
215:6	366:11, 13	9, 10, 12, 15	248:2	283:4
336:11		79:17, 20	254:1 331:2	

326:20, 22 419:10 methods 377:11 METHVIN 3:20 methymerc ry 296:22 mgs 289:12, 13, 14 mice 28:11 41:18 189:21, 22, 24 194:3, 20 195:7, 8, 13 199:10 200:4 289:12 415:5 middle 284:16 381:14 415:23 MIE 295:15 296:5, 15 297:10, 12, 20 317:14 MIEs 295:18 297:5 MIKAL 3:3 MILES 3:22 Millennium 3:6 milligrams 304:19 mind 76:10 186:6, 7 206:15 342:15 mine 41:15 154:3 178:19 242:7	minimum 345:17 mining 431:23 miniscule 213:2 241:2, 6 minor 17:3 76:5 minute 26:5 111:1 145:19 148:1 435:20 Minutes 9:21 34:22 353:19 387:12, 13 394:11 418:15 misinterpreti ng 294:20 misread 175:15 misrepresent ations 401:12 misrepresent ing 284:21 missed 197:8 303:6 missing 177:21 271:25 339:12 350:9, 25 428:18 Missouri 1:19 3:12, 18 445:18 MITCHELL 4:11 mitigating 377:12	mitoses 19:20 mixed 293:25 340:17 model 22:20 23:2 28:8 35:10, 12 39:12 41:17 42:22, 25 44:17 47:4, 10 75:11, 12 85:3 190:17 192:2 193:18 194:15 197:1 198:4, 7, 24 204:21 267:23 270:7, 8 276:2, 3 282:2 288:24 325:7 328:17 344:1 347:2, 7, 8 380:8, 10 383:9 384:6, 7, 14, 16 397:15 398:13 415:4 modeling 328:3 models 24:1 25:12 41:18, 20 45:4 48:6 70:2 109:13	170:8, 11 185:17 196:10, 11 204:2, 22 310:1 328:8, 9, 11, 12 340:20, 21 341:4 342:3 343:15, 18 345:12 356:22 357:20, 23 362:18 379:13, 22, 24 380:3, 6 384:6 393:10 modified 138:15 317:9, 13 modify 139:6 235:19 416:17 molecular 51:3 57:24 78:25 122:15 188:25 323:7 molecular- initiating 296:18, 21 molecularly 300:12 molecules 52:19 198:22 300:6, 20 mom 228:14 234:16 361:1	moms 363:25 money 168:6 169:6 410:13 424:15, 22 425:11, 13 435:15, 20, 24 436:4, 15, 25 438:6, 18 Monica 4:5 monitor 151:22 348:15 398:21 monitoring 277:13 monomer 398:21 Montgomery 3:24 month 119:24 145:14, 16 153:2 months 275:12, 13 Moore 116:7 174:16 Moore's 173:19, 20 morning 12:3, 4, 22 13:16, 17 114:10, 25 256:10 morphologic al 275:2 MORRIS 6:1 236:5
--	--	---	---	--

MORRISON	44:17	411:16	207:23	394:4
5:22	75:11, 12, 15	420:2	208:2, 13, 25	395:3
Morristown	170:8, 9	multiply	209:4	397:12, 22
4:21	190:5, 17	287:4	222:8	399:12
mother	191:10, 12,	MURDICA	255:9, 17, 24	400:12
110:6, 24	15, 17 192:6	4:9 8:5, 7,	256:4, 6, 24	401:10, 17
200:13	193:25	9 12:2, 9	261:17	402:2
202:2, 9	194:1, 9, 15,	13:4, 11, 15	266:16, 20,	403:7, 16
210:15	17, 19 199:4,	24:3 64:5,	23 269:1	404:5
272:6, 9, 14	7 200:2	13, 16, 18, 20	279:10	406:10
358:23	204:20	65:24 66:2,	284:12, 24	407:1, 4, 13,
359:24	287:1	6, 7 67:22	285:2	23 409:17
360:9, 20	380:3, 8	82:2 86:6,	298:23	410:8
361:8, 21	mouth	8, 16 97:1	308:18, 20	411:2, 13
mother-	201:3	98:1 103:6,	312:20, 24	414:15, 23
child 210:2	202:24	14 104:10,	313:17	415:17
mother-	move 97:9	19, 21 107:2	314:9	417:17
infant 225:8	111:19	111:10, 18,	320:2, 5, 11,	419:1
mothers	248:18	23 115:16,	17 322:8	421:13, 21
214:24	254:10	19 116:2	331:24	422:12, 20
226:5, 16	265:5	118:22	335:8	424:2, 24
228:10	327:23	124:25	336:1	425:6, 16
229:17	369:21	125:4	337:12	428:22
231:3	421:19	127:11	338:15, 16	429:7, 17
250:20	movement	128:16, 20	339:2	433:22
328:4	147:5	133:13	341:1, 9, 17	434:6
352:8	moving	141:11	343:2	435:1, 10, 14
353:7	145:19	142:2	344:15	436:8, 17, 20
383:5	Multicenter	144:19	347:13	437:3, 8, 15,
400:22	8:18 118:4,	145:6	353:17	19 438:8, 11,
mother's	12 119:1	147:3, 18	354:5	19 439:3, 13,
224:17	multiple	148:9, 10	364:19, 23	18 440:2, 8,
MotherToBa	49:16, 17	149:17, 21	369:19	12, 19
by 143:11	54:13	150:6, 9, 18,	375:5	441:16
motor	56:15	22 151:5	376:9, 14	442:19
309:14	75:18, 21	164:13, 17	378:4	443:24
310:7	197:23, 24	166:12, 18	379:6, 19, 20	Murdica's
336:23	199:21	167:3	380:16	284:11
mouse	219:24	168:7, 14	381:2, 3	390:23
28:19	221:21	169:1, 9, 10	382:12, 22	murine
35:12	271:13	176:3, 6, 9,	384:11	118:5
38:23	303:9, 13	25 177:2	386:1, 20	mutation
39:12	375:25	184:3	391:8	75:10, 19
		205:8, 12	392:13	

138:19	NAPQI	159:22	nervous	160:9, 23
380:8	305:10, 15,	177:11	22:12, 13	197:2
mutations	24 306:2, 4,	197:20	322:22	310:2
66:17	10 307:25	255:23	nest 194:21	372:3
72:19 75:7,	321:4	269:10	nest-seeking	417:22
21 76:1	328:4	293:15	193:6, 13, 18	neurodevelop
138:25	329:11	299:3	194:11, 14,	mental 22:9
356:11, 14	330:1, 6, 16	318:5, 8, 10	21	82:7
359:24, 25	National	325:25	Netherlands	153:10, 16,
360:1, 4	25:21, 22	329:15, 22	316:11	23 154:15,
380:5	52:22	330:2	Network	20 156:14
muted	53:11	333:17	10:13	187:20
255:24	216:25	340:24	403:2	192:17
	217:11, 18,	353:18	404:17	196:5, 6
< N >	22 355:2	358:13, 15	neural 16:3,	232:19
N.W 4:16	389:1, 3	360:7	5, 6, 8, 9, 16	233:23
5:2	393:18, 24	362:10	21:19	234:22
NAAED	NC 394:17,	364:14	22:23	250:12
164:5	20	365:1	23:20 24:4	309:12
N-acetyl	NCRA	381:25	25:6, 11	310:5
244:18	445:16	405:25	26:21	350:16
245:2	necessarily	410:17	27:14 33:7	352:9
250:2	19:17 20:8	437:10, 17,	35:6, 14, 19	372:13
307:22	39:12 87:2	21	37:21 42:2	415:25
330:19	200:7	needed 17:4,	53:9 55:16	417:24
name 11:2	252:9	10 285:10	69:3 85:3,	neurologic
12:5 13:18	274:15	330:15	5 170:15	24:6 38:17
95:25	295:24	340:18	188:14, 20	39:2, 13
126:18	356:21	342:22	250:15, 17	41:13 56:7
173:6	382:10	370:25	354:14	320:22
178:2, 4, 8	385:16	371:17	400:15	322:14
218:25	necessary	needs 180:5	401:1	323:4
219:2, 5	138:23	422:6	neuro 22:18	329:13
262:1, 5	139:3	negative	330:4	334:7
365:12	320:13	73:21 74:3,	neurobehavi	neurological
387:24	322:15	8 218:11, 12,	oral 26:12	22:18
417:9	446:4	17 221:20	191:12, 24	35:23, 24
names	need 65:22	374:3, 22	192:12	37:5, 17
14:17	73:15	401:6	396:20	321:22
177:20	86:25	Neither	neurodevelop	Neurology
178:6	89:12	196:20	ment 9:9	414:5
name's	90:23	323:9	21:17 22:7	neuroticism
172:24	116:17, 18	445:10, 11	36:25	364:3
	125:11		152:2	

neurotoxicity 82:6 187:25 188:2, 6, 8, 10, 14, 16 311:9 neurulation 21:18 22:21 23:4, 5, 20 never 13:22 43:8 52:5 72:16, 22 74:22 101:11 126:11, 12 132:18 210:24 211:4 218:8 226:4 248:23 292:19 332:17 334:23 337:18 430:2, 3 440:6 nevertheless 68:6 NEW 1:1, 19 2:24 4:21 5:8, 14, 24 6:8 11:13 19:6 26:19 114:9 194:2, 3 313:6 445:21 newborn's 250:6	newer 48:12 49:1 NIEHS 394:7, 15 night 115:3, 5 NIH 54:1, 3, 18 84:24 394:6, 10 NOAEL 293:18 nods 50:6 155:16 172:20 212:9 272:8 nonclinical 340:3 348:1 non- exposure 346:2 non- hepatocarcin ogens 304:1 non-leading 421:16 438:12 nonnormal 168:24 non-real 277:20 nonsensical 147:10 nonverbal 396:24 normal 14:24 15:1 68:1 163:2 192:25 194:22 238:8 345:8 354:17, 20, 22 418:21	normally 163:12 166:3 306:7 337:4 359:6, 17 North 2:16 45:8 47:20 121:8 Norway 216:14 Norwegian 267:3 Notary 445:23 447:19 notch 324:5 note 236:25 367:25 noted 11:15 20:6 39:17 446:10 447:7 notes 12:13 254:12 449:1 NOTES..... 449 10:22 notice 175:3 278:18 noticed 17:4, 6 281:25 410:19 435:17 noting 254:13 Notwithstand ing 366:15 November 393:15	novo 356:10, 14 359:25 360:4 NTP 291:6 null 87:23 88:1, 24 241:1 273:3, 5 275:25 280:9 281:7, 10, 19 352:5 number 64:12 81:8 133:9 213:6 215:7, 9 221:3 240:23 248:13, 16 266:19 270:17 273:21 302:10 316:9, 15 338:14 345:13 348:3 397:20 398:2, 14, 19 399:21 407:20, 21 408:23 412:4, 8 427:17 numbered 150:11 295:5 319:1 numbers 241:14 242:21 numerosity 243:3	numerous 121:16 319:22 372:11 nurse 34:19 nurturing 360:25 nutrition 31:1 33:1, 3, 5, 6, 11 NW 5:18 < O > oath 284:14 378:12 379:8, 11 424:4 425:8 426:1 437:9 Object 67:14 97:18 104:16 106:23 144:12, 25 169:2 268:22 284:6, 20 392:13 401:10 403:7 417:17 424:19 425:3 441:12 objected 174:23 Objection 23:18 81:22 96:16 103:2 141:5, 19 146:23
---	--	---	--	---

164:11, 15	440:7, 11, 15	243:20, 22,	oftentimes	22:16 23:7,
183:23	442:16	24 246:3, 5,	357:2 362:7	13 25:1
261:13	obligated	21, 23 248:7,	Oh 32:3	26:3 27:18,
308:16	421:17	18 384:18	71:22 92:6	22 28:23
335:2, 18		OECD 8:13	96:5	29:13, 15, 20
336:25	observational	50:19, 22	113:21	31:7, 21
338:6, 22	350:17	56:1 187:7,	116:3	32:9, 14, 19,
340:12	370:22, 23	17 309:1, 18,	134:3	25 33:16, 25
341:8, 13	371:17	23 310:24	144:4	34:7, 21
342:13	observations	offer 101:9	152:7	35:16 36:7,
344:8	195:11	206:25	164:23	14, 21 37:2
347:5	observed	264:18	176:16, 22	38:4, 15, 22,
353:9	47:4 77:4	333:8, 20	178:4	25 39:11, 25
374:18	376:19	335:13	229:13	40:4, 9, 12,
376:8, 13	obstetrician	337:25	242:6	19 41:1, 8,
378:1, 21	108:20	offered	243:5	24 42:1, 8,
379:15	173:3	98:16	254:22	15 43:1, 8,
382:7, 17		138:6	255:24	14 45:7, 15
384:2	Obstetricians	143:20	258:11	46:8, 17
385:21	108:19	332:24	263:9	47:9, 24
394:4	Obstetrics	offering	274:12	48:25
397:22	143:9	43:13	281:13	49:18, 23
400:12	obtain 418:9	147:19	295:13	50:3, 16, 21
402:2	obviously	334:2	302:5	51:9, 15, 21
404:5	381:17	440:22	304:24	52:15 53:1,
406:10	Occasionally	443:21	308:11	9, 24 54:2,
407:1, 4, 13,	418:18	offers 309:8	348:22	19, 23 55:3,
24 409:17	occipital	Officer	363:17	6, 18 56:3
410:8	26:23	151:20	365:9	58:1, 10, 14
411:13	occupational	152:20	377:4	59:25 60:7
414:15, 23	94:21	153:2, 7	387:1	61:3, 15, 19
415:17	100:3, 4	offices 1:12	391:15	62:2, 21
421:13	358:11	offspring	396:13	63:9 64:8,
422:20	occur 198:2	9:18 36:5	412:14	25 65:2, 8,
424:18	occurring	190:25	414:7	11 66:14
425:15	186:11, 13	355:8	429:20	67:4, 7
428:19	occurs	358:25	Okay 13:1,	69:15, 19
429:4, 14	22:10	360:2	3 14:1, 3, 20	70:5, 9, 14,
433:20	275:17	361:2	15:3, 9, 15,	25 71:6, 19
434:1, 18	297:23	366:14	20 16:1, 8	72:15, 21
435:7	odds 87:22	367:16	17:1 18:8,	73:1, 9
436:8, 18	211:19	Ofirmev	17, 22 19:2,	74:2, 6, 12,
438:8, 19	239:11	289:9	10 20:11	24 75:6
439:3, 13, 18	242:5		21:15, 23	76:18, 21, 25

77:21 78:1, 17, 20 79:21 80:5, 14, 25 81:6, 12 82:3, 11, 18 83:6, 10, 14 84:1, 18, 21 85:8, 20, 24 86:17, 20 87:3, 13, 20 88:2 89:10 91:1, 10, 21 92:2 93:1, 4, 12, 18 94:23 95:5, 10, 14, 19 96:8 97:15 98:7, 14, 20 99:2, 9, 12, 16, 21 100:5 102:20 104:11, 19 105:8, 14, 23 106:4, 9, 17 107:6, 13, 17 108:5, 8, 16 109:1, 21, 25 110:15, 25 111:20, 24 112:15, 19, 24 113:2, 11, 15 114:1, 7, 13, 22 115:4, 9, 18 116:8, 13, 21 117:2, 9 118:18, 23 119:5, 8, 13, 17, 20, 23 120:21 121:4, 18 122:9, 12, 18, 23 123:22 124:3, 8, 11, 16 125:14,	16 126:23 127:19, 23 128:2, 6, 9, 21 129:1, 4, 23 130:7, 25 131:5, 15 132:15, 18 134:6, 17, 22 135:2, 22 136:14 137:24 140:10, 18, 24 143:11, 13, 23 144:20 145:18 146:1, 6, 10 147:18 148:23 149:17 151:9, 15, 19 152:10, 12, 13, 23 153:1 154:1, 13 156:18 157:1, 14 158:10, 23 159:9, 18 160:13, 24 161:3, 16 162:2, 6, 9, 14, 20 163:2, 15 164:10, 25 165:4, 10, 14, 19 166:12 167:8, 16, 23 169:11, 16, 19, 22 170:24 171:3, 10, 22 172:1, 4, 10, 17, 25 173:10, 14,	22 174:8, 22 175:6, 25 176:5, 10, 25 177:1, 13, 24 178:12 179:1, 4, 10, 24 180:3, 24 181:15 182:4, 16, 22 183:11, 17, 19 184:9, 17, 24 187:11, 19 189:8 198:3 200:9 201:1, 20 202:7, 18 203:7, 21 205:5, 13, 17, 25 206:14 208:13, 25 209:16, 21, 25 210:5, 11 211:10, 14, 25 212:18, 22 213:8, 15, 20 216:9, 19, 22 217:3, 6 220:4, 21 222:11, 22, 25 223:4, 19 224:1, 7, 10, 16 225:3, 13 226:21 227:7, 10, 14 228:5, 23 230:13, 21 231:15 232:3, 21 233:5, 11, 15, 20 234:14, 23 235:2 236:11 237:2, 10, 17	238:16 239:2, 7, 23 241:24 243:11 244:11, 21 245:1, 2, 16, 24 246:7, 24 247:8, 19 249:1, 5 250:18 252:24 253:19, 24 254:9, 24 255:9, 21 256:10, 18, 25 257:6, 9, 10, 13, 16, 21, 23 258:2, 17, 25 259:6, 12, 21, 24 261:23 262:18 263:7, 14, 19, 24 264:8, 12 265:5, 13, 18 267:13 268:20 269:19, 25 271:5, 21 275:20 276:13, 22 277:4, 16 278:8, 15, 20 279:2, 5 280:11 281:16 282:10, 15 283:1, 12, 21 284:19, 24 285:15 286:24 287:18 288:15, 22 289:3, 21, 25	290:6, 9 291:16 292:4, 13, 19 294:16, 21 295:10, 14, 18 297:13, 25 298:3, 7, 13, 17 299:13, 17 300:15, 19 301:4, 9, 11, 15, 19, 22, 24, 25 302:12 303:11 305:2, 3 307:14 308:6, 21 309:3, 15 312:2, 16, 20 313:4, 11 314:13, 21, 24 315:3, 17, 24 316:8, 14, 20, 24 317:5 319:12, 19, 25 320:2, 5, 6, 7, 8, 11, 15, 18 321:20 322:12 324:4 325:2, 10 326:16 327:7 329:6, 18 330:13 331:25 332:11, 17, 21, 23 333:12, 19 334:4 337:17, 24 338:17 339:3, 9, 17, 22 341:18
---	--	---	--	--

344:5, 16, 20	397:11	OMIC	287:17	182:7
345:7	398:14	393:5	289:8	184:19
346:11	399:4, 10, 21	OMIM	334:12	185:13
348:6, 20	401:4	122:1, 2	359:16	186:18
349:2, 12, 24	403:15	omission	430:13	200:23
353:17	406:22	211:8, 21	open-ended	201:6
354:9, 12, 18	408:9	221:10, 13	168:23	203:10
355:6, 11, 20	409:6, 15	omissions	169:2	205:6
356:8, 25	410:12, 20	212:14	opens 405:6	206:1, 25
357:14	412:2	once 57:19	opine 15:17	208:22, 23
359:8	413:6, 11	59:10	38:16	209:6
360:6, 20	414:12, 20	84:19 226:7	opined 43:4	220:24
361:13	415:7, 10	ones 27:6	279:20	221:5
362:4, 13, 24	416:5	48:12 49:2	opining	232:22
363:10, 17	417:3	102:12	103:20	235:3
364:5, 11, 16	418:14	131:5	181:2	244:9
365:9, 10, 17	419:19	167:9	282:13	264:19
366:1	420:14	237:17	opinion	279:3, 6
367:9, 24	421:18	290:7	23:10, 12, 14	310:9
368:12	422:8, 17, 24	325:17	29:7 43:13	311:15
369:9, 20	423:5, 22	362:14	67:13	312:17
370:16	424:7	363:15	68:20	326:3
371:3, 24	425:10	365:21	82:12	329:25
372:8, 14, 22	426:7, 17	405:3	87:14	333:9, 21, 25
373:1, 23	428:23	one-third	93:25	334:2
375:6	429:18	225:10	96:10, 13, 20	335:22, 24
376:4	430:13	one-time	97:22 98:2,	337:25
377:9, 14, 19	432:11, 18,	253:11	9, 16, 23	354:14
378:14	24 435:10,	Ongoing	100:11, 21	357:13
379:7, 11, 19	21, 22 437:3	45:21, 22	101:9, 12, 22	401:25
380:17	438:23	338:24	102:5	409:9
381:9, 16, 24	439:16	392:21	104:13	411:11, 23
382:23	441:22	online 65:2,	105:3, 7	422:19
383:3	442:12, 25	7 119:15	107:4, 7	opinions
385:2, 8	443:24	121:23	113:9	15:10
386:2, 20	444:4	127:20	114:4	18:18, 20
388:13	old 25:25	158:13	138:6	19:8 28:23
389:12	olfactory	176:15	145:3, 8, 9	55:21
390:2, 22	193:23	348:14	149:12	87:13
392:19	oligogenic	open 38:9	159:5, 11	101:15, 23
393:13	139:3	76:9 83:1	161:6, 9, 20	102:12, 16,
394:2, 25	OLIVO	113:23	162:23, 24	22 105:22
395:15	6:22	195:23	180:4, 5, 12	108:10, 19
396:3, 9		257:21	181:17	140:25

141:7	ORDER	263:10, 12,	267:16	217:14
143:20	1:6 73:16	15 264:6	277:5	218:7
146:13	79:6	291:20	296:6, 7, 13	230:17
147:20	171:14	446:14	305:6	234:7, 22
153:3	194:1, 12	originally	307:2	250:12
155:8	200:11	50:20	308:22	266:3
158:24	202:20, 23	223:18	309:3	268:16
179:25	237:18	313:13	310:15, 21	277:11
205:21	252:2	400:24	312:5	311:1
288:10	269:20	425:13	313:13	320:23
308:12	330:3, 21	orthopedic	317:25	322:23
326:19	352:1	34:19	319:15	328:22
332:25	358:16	OTIS 24:19	321:20	337:8
366:5	400:25	142:6, 16	326:18	340:23
411:25	419:14	143:2, 3, 4, 6	342:5	341:4
412:5	420:12	145:20	361:14	342:7, 20, 21
423:6, 9	422:5 427:4	outcome	367:15	347:4
440:5, 21	organ 20:21	40:21 50:4	382:11	350:16
443:22	organism	55:25	383:1	357:17
opioid	51:5, 8	62:21, 22, 23	390:17	377:25
110:23	323:10	65:10, 12, 15	410:21, 24	378:7
opioids	organisms	85:7 98:12	412:3, 8	382:16
110:15, 17,	51:6	102:6, 24	415:9	384:14
18	organization	105:5, 18	417:10, 15,	420:19
	50:16	137:3	20 418:2	433:5
opportunities	52:21	138:14	427:18	outcome-
334:20	53:23	181:2, 4, 6	432:3	specific
opportunity	141:25	182:12	433:11	180:6, 14
244:6	146:11, 16	184:10, 14,	434:14	outrageous
opposed	296:11	18, 21	Outcomes	147:11
139:18	394:20	185:12, 25	8:13 41:13	outside
318:16		186:9, 19	56:13	14:18
357:4	organizations	187:21	77:11 93:9,	15:18 43:9
opposite	54:13	189:5	22 94:10, 18	68:1 74:21
221:16	141:2, 16	190:13, 25	109:3, 5, 8	86:1 94:15
282:19	organogenesis	191:8	181:7, 10, 11,	106:5
284:2	s 20:5	198:1, 4	14 182:14,	107:13, 17,
352:10	original	200:1, 8	15 185:11	20 108:8, 11,
option	18:3 50:11	210:3	186:8, 11	12, 13, 21
137:17	54:7	219:13	188:7	141:10, 23
oral 201:14	256:13	229:8	189:23	162:18
290:24	257:1, 7	235:10, 24	190:16, 19	163:10
291:3, 4, 8	258:6, 8	247:17	196:5	171:20
	259:7	265:11, 25	210:7	215:12

289:4	19 304:3, 11,	253:8	pains	370:18
291:20	13 305:11	254:12	228:12	416:5
325:17	307:7	257:7, 17	229:18	parallel
354:17	310:1, 3	258:10	249:18	182:15
overadjustin	321:2, 8, 11,	263:10, 16,	pair 272:2	192:20
g 276:5	17, 21	20 270:1	pairs	196:12
overall	322:13	279:25	130:18	312:13, 14,
96:23	323:14	297:14	210:3	15, 16
433:13	325:8, 18	300:1	panel	323:24
overcorrectin	326:3	302:2, 13, 15	425:24	328:13
g 275:24	328:2	315:18	paper 37:21	parallels
overlap	329:12	318:24	91:24	196:14
25:10 63:8,	356:13	332:12	92:11, 15	parameters
11 160:10	412:19	338:12	115:20	139:19
185:14, 19	oxidized	347:21	116:6	Parchem
186:14	304:13	348:5	123:24	172:24
187:9, 16	306:19	349:25	125:20	173:7, 8
188:25	Oxnard	363:7	126:8, 15, 17	parent
326:25	6:13	365:3, 25	127:7, 8	359:1
360:15		370:16	129:25	parents
382:20	< P >	373:6, 14	180:16	359:1, 18
416:18	p.m 167:1	375:7	222:1	parity
417:20	255:13, 15	381:9, 14	227:25	225:22
overlapping	314:5, 7	410:2	324:4	Park 3:6
184:22	354:1, 3	414:5	365:12	4:12, 21
277:2	387:16, 18	415:21	370:7, 10	part 14:11
409:23	444:6	448:3 449:3	413:20	24:5 25:7
overview	packaging	pages 16:21	416:23	27:11
391:21	333:9	147:21, 22	417:7	28:21 33:9
overwhelmin	packing	150:11	419:24	58:25 64:1
g 29:11	219:21	162:10, 15,	420:5, 12	65:12, 14
oxidation	PAGE 8:2,	16 295:4, 9	papers 28:5	69:13
304:6, 7, 15	12 58:23	447:5	60:5 116:8	86:22 87:3
305:13, 19,	116:22	paid 100:7,	132:25	90:10, 11, 13
21 306:2, 17,	117:3	16 101:4, 8	419:2	93:17, 19
18 321:24	118:2	102:4, 13	paragraph	95:11
oxidative	123:15	167:11, 24	150:15	123:2
8:16 56:11	129:13	168:17	263:25	135:6
57:3 58:2	130:7	171:7, 13	302:21	138:25
59:19	133:3	pain 228:21	347:22	143:12
116:6	136:21	229:4, 23, 25	348:5, 24	147:5
296:3	152:6	painful	349:13	149:12
297:17, 22	210:6	228:18	365:25	159:1, 4, 8,
299:14, 15,	230:24			10, 15, 16

161:19	420:3	236:17	particulate	299:22, 23
162:23, 24	421:10	261:5	399:15, 18	300:1
163:1	433:8	274:6, 9	parties	304:6, 14
174:17	434:14, 17	277:11	445:10	305:7, 12, 13,
180:7, 22	435:9	318:3	partner's	19, 22
184:23	442:10	324:12	374:6	306:21
185:3, 15, 23	partially	328:6	parts 26:8	308:22
187:7	193:23	335:15	198:8	309:4, 6
190:18	343:14	341:15	402:4 408:5	312:5
191:20	408:6	362:11	Party 6:19	317:25
193:9, 10, 14,	participants	366:9	pass 169:9	323:13, 15
21 194:6, 17	210:1, 22, 24	378:24	423:25	324:1, 13, 14,
195:17, 19	211:3	385:10, 11	439:25	16, 22 325:4,
196:10	212:20	390:13, 16	passage	5, 20 326:13,
203:6	213:6, 9, 16	393:12	277:12	15 327:8, 19
209:3	participate	399:15	Passing	356:12
210:23	422:8	417:20	90:20	392:4
211:6	particle	427:18	pasted	410:21, 24
217:12, 22	85:16 202:4	430:6	317:13	412:3, 8, 10,
218:2	particles	particularly	paternal	15 415:9
221:1	85:19	19:18 28:8,	358:17, 22	417:10, 15
240:7, 10, 12	particular	17 30:22	pathogenesis	Pathways
255:3	19:12	41:18 44:4	415:11	8:13 39:7
260:17	20:21 25:2,	48:11 68:7	pathologies	65:10
261:3	20 30:19	77:25	122:17	189:1
263:5	38:17 39:2,	85:17 91:7	185:19, 21	319:22
290:14	13 40:15	92:3, 5	pathology	323:21
294:5, 7	41:2 46:16	93:10	38:20	325:9, 15
305:11, 21	50:7 51:3	109:24	184:22	326:5
308:21	52:13 54:9	110:2, 23	198:18	416:7, 20
309:4	65:5 75:9,	185:16	pathophysiol	418:3
311:18	10 76:12	188:5	ogy 415:12	432:19, 21
312:11	77:11 78:3,	197:23	pathway	patient 46:9
314:18	13 95:25	216:14	50:5, 17	72:7, 22
317:17	124:1	221:9	55:24, 25	73:2, 5
339:16	182:20, 24	262:12	56:14	78:13
360:24	183:3, 25	281:5	57:17, 20	182:18
388:19	190:15	303:3	58:20 59:8	191:21
389:25	191:7	357:2	62:22	214:14
390:12	198:21	358:25	63:16, 18, 24	243:13
394:7, 15	216:12	361:17	65:13, 15	335:11, 15
400:23	219:13, 20	380:5	187:13	patients
404:18	221:19	406:19	296:8	26:16 27:8
415:24	232:8	425:23	297:18, 24	37:12, 15

66:11, 13, 15, 18, 19 72:8, 18 75:18, 22 76:2 84:2 158:22 186:1 248:13 327:3, 9, 10, 11 331:1 356:1 pattern 76:1 patterns 396:25 Paxil 94:25 95:5 98:9, 15, 17 100:10 Pediatrics 254:14, 19 255:2, 6 peer 130:8 419:20, 22 420:3, 15, 16, 25 421:7, 24 422:9, 14, 17, 25 423:4 433:8 peer- reviewed 64:23 422:16 pen 242:6 pending 308:19 Pennsylvania 5:18 6:3 people 14:13 35:25 37:17 44:11 47:12 54:24	67:21, 23 68:4 81:8, 16 82:22 89:23 138:24 149:5 166:7 172:23 189:18 193:1 194:2 207:1, 2 209:12 218:19 219:5 282:18, 24 353:5 422:2 443:4 percent 89:19 138:19 168:8 212:23 215:22 231:19, 20, 21, 22 232:4 233:22, 23, 24 265:13, 17 307:18 330:15 377:24 378:7 percentage 232:10 234:3 247:1 378:16 390:2 423:12 percentages 352:20 perform 75:4 266:5	performed 73:7 285:8 344:12 356:6 363:11 performing 74:22 peri 223:7 perinatally 223:16 period 110:4 223:5 227:2 253:15 275:7 334:21 370:14 periods 251:10 peripartum 223:5 253:14 permission 105:25 434:20 permitted 434:16 persistent 210:12, 13, 25 211:15 212:8 221:9 person 31:24, 25 41:7 73:22 74:5 142:17 172:11, 21 315:8 316:16 320:3 personal 67:13 107:17, 21	108:13 168:4 171:21 209:9 personally 67:3, 6, 9 77:9 228:17 234:18 person's 342:15 perspective 385:19 Ph.D 1:12 8:18 9:15, 17 11:20 445:4 447:12 pharmaceuti cal 76:19 200:24 Pharmacovig ilance 9:21 phase 208:22 209:3 phenobarbita l 44:2 phenotype 393:9 395:18, 21, 25 396:2 phenotypes 395:7, 16 phenotypic 189:2 Philadelphia 6:3 Philip 236:5 philosophy 33:19, 21 phone 94:13 273:14	physical 137:14 physically 123:7 physician 72:13 335:10, 12, 13, 20, 21 336:5, 8 physician- diagnosed 231:8 physicians 48:3 70:3 334:25 337:3 physician's 34:18 PI 41:11 42:14 pick 318:9 325:5 431:9 pictorial 300:24 piece 143:3, 5 239:16 411:9, 15 pile 219:12 pill 201:6, 16, 19 pioneers 400:11 Place 4:21 57:14, 16 178:24 419:17 431:20 445:7 placenta 202:14, 17, 19, 22 203:2 places 168:12 plain 368:18
---	---	--	--	---

plaintiff	311:19	200:4	portion	369:1
101:15, 17	312:1	204:12	26:10 27:1,	377:13
105:16	320:20	205:25	2, 3 68:19	posted
184:6	325:25	218:5	71:11	292:9
Plaintiffs	327:16	241:4, 8, 14,	385:12	POSTMAN
4:6 81:17	331:6	15 245:18	PORTIS	2:8 6:23
95:3, 6	plausible	246:9	3:22	postnatal
98:15 99:6	324:21	280:25	position	309:14
100:7	327:20	353:18	15:16	310:6
101:9, 22, 24	play 208:9	354:19	29:12	postulated
105:21, 24	Plaza 2:16	377:10	44:12 82:1	433:3
107:8	3:6	pointing	143:2, 4	potent 44:5
108:6, 9	Please	139:15	146:2	potential
111:2	13:18	points	180:15, 20	110:22
146:20	23:13	245:25	391:3	149:14
167:12	115:13	317:23	positive	190:13
183:1	118:19	338:20	211:4	219:10, 11,
244:5	125:1	policy 106:5	218:18	22 229:22
372:19	127:13	pollutants	219:9	265:22
376:7	128:17	399:14, 18	220:8	272:22
424:16	224:21	pollution	245:18	276:1
425:12, 14,	247:15	85:17	246:9	283:7, 10, 11,
20 426:8	322:11	polygenic	270:9	25 319:22
435:15	387:6	139:5	271:2	322:20
plaintiff's	446:3, 8	pool 188:11	277:19	323:21
100:12, 17	plenty	poor 262:23	350:14	330:10
101:4	307:17	population	384:18	346:19
102:4, 14	PLLC 2:20	89:6 149:8	401:8	347:8
104:15	pluripotent	200:19	possibilities	358:20, 24
105:3	170:14	212:23	241:23	360:5, 21
278:21	plus 128:4	213:2	possibility	361:1
plan 74:22	245:11	214:23	171:25	362:2
325:1	point 18:8	217:13	185:9	372:1, 4
planned	29:2, 6	328:25	241:2, 19, 21	375:16
55:14 172:8	30:3 39:10	330:10	337:14	381:24
planning	53:15 75:7	363:24	359:21	393:11
334:10	76:2 81:7	366:7	366:1	432:2
plant	85:15	374:25	373:7, 19, 24	potentially
395:22, 24	88:12, 15	382:4	374:1, 15	37:16
Plasma 9:11	89:3	populations	375:3, 10	38:13
plastics	116:10	374:7	376:18, 25	60:15
398:23, 25	154:22	PORTER	377:16	232:18
plausibility	155:17	5:4	possible	277:15
310:13	196:2		328:25	316:11

317:15	pre-disease	209:23	Prenatal	presume
358:7	392:23	213:23	10:11, 15	249:5
361:15, 16		214:17	372:2	preterm
362:1, 5	predominant	216:3, 13	preparing	225:23
366:24	138:7	225:14, 20,	12:13	231:12, 16,
399:8	254:5	21, 22 227:4,	prepublicatio	19 232:5, 10,
422:4	265:11	8 230:3, 17	n 317:2	15, 19, 25
429:25	Predominant	233:16, 22	prescribe	pretty 423:2
power	ly 16:10, 11	234:17, 21	215:6	prevalence
277:10	26:22 27:4	235:5, 17	336:11	10:8
294:10	37:13	249:10	presence	prevent
powerful	201:4, 5, 7,	250:11, 21	305:5	16:13 33:7
283:14	18 345:10	251:7	308:7	423:14
Pozner 96:3,	prefer	268:16	328:10	preventable
4, 6, 8	199:16	270:18	PRESENT	389:11
PRAC 9:21	371:13	271:1	6:19 52:24	preventing
279:12, 13	preferable	272:16	135:8	436:23
practice	337:11	273:23	249:7	437:1
66:10	preferably	274:7, 10	280:23	prevention
174:11	89:16	275:1, 11	330:16	16:15
214:19	prefers	280:5	333:1	217:11
350:7	199:16	333:23	358:23	315:7
practicing	pregnancies	334:8	presentation	355:3
214:13	45:23	335:7, 21	75:20	389:11
pre 223:7	224:18	336:17	76:15 79:1	previous
340:7	251:4	337:10	122:17	267:9, 10
precede	pregnancy	338:4	185:15	276:15
350:25	9:7, 18	345:23	189:2	381:23
preceded	10:6, 8	351:20	315:6	previously
276:16	19:12, 14, 21	355:13	322:16	121:1
Preceding	21:22	357:17	360:18	132:6
223:25	22:25 23:6,	365:21	396:1	152:22
224:1, 3	11, 16, 24	366:4, 20		157:19
227:8	44:22, 24	374:5, 9	presentations	266:25
preclinical	46:6, 20	381:7 409:5	141:9	273:18
162:5	47:2, 13, 20	pregnant	presented	299:23
340:5, 6, 8	49:5, 11, 25	84:2 110:3,	20:1 53:15	381:11
341:2	108:24	10, 23 147:6	presenting	382:8
preclude	109:3	166:7, 11	53:16 55:14	392:16
351:1	157:6, 10	200:2	Press	402:13
precludes	160:4	201:1	151:20	428:5
350:9	163:20	328:3	152:20	primarily
predictive	164:6, 20, 21	400:21	153:2, 7	15:23 16:2,
341:5 349:5	165:1			5 139:12

primary 32:1 56:8 170:2 253:25 306:7 315:21 389:7	162:18 228:8 237:6	23:3 35:14 56:11, 12 57:2, 23 58:9 78:25 82:6 85:5 105:12 138:14 170:11 299:15 306:18 312:9 322:23	professor 32:12, 16, 18, 20, 21 proficient 422:3 profiling 10:2 profound 24:7 44:23 197:7 profoundly 188:21 189:6 program 32:11 217:19 390:1 393:17 394:22 project 394:22 projects 392:21 proliferative 357:3 prolonged 110:4 promote 219:20 pronunciatio n 117:13 proof 63:16 102:21 105:8, 12 130:10 409:15 proper 229:3 properly 229:19 proportion 234:2 proposal 84:14, 16, 23	propose 215:10 277:8 324:21 proposed 319:22 320:20, 25 322:12 323:15 324:9, 13 325:4 proposing 83:16 proposition 133:1 135:13 propounded 447:6 prospective 10:9 44:22 45:5 46:4 47:7, 13 49:5 165:1, 12, 15 prospectively 47:5 365:20 protect 104:25 214:17 protected 214:25 protection 8:15 296:2 412:19 PROTECTI VE 1:6 16:12 51:22 88:20 214:5, 6 215:14 221:17, 22
principal 388:22, 24 principle 179:11 181:16 principles 138:12 169:11 180:5, 11 181:20 print 115:7 printout 127:21 391:8 printouts 395:3 prior 30:11 64:21 77:12 80:15 140:7 230:6, 12 255:4 319:16 337:10 363:17 371:25 388:13, 16 445:3 privately 144:21 privileged 176:2 probably 57:15 77:8 148:5	problem 94:12 110:22 195:4 271:24 272:19 276:1 313:25 problems 35:25 39:15, 19 160:8, 9, 22 262:16 353:8 proceed 86:18 151:7 167:6 255:19 256:8 314:11 354:7 process 151:23 170:19 305:20 307:17 314:25 315:12 321:5 419:20, 23 420:4 421:11, 25 422:9, 25 423:4 processed 290:11 291:11, 13 processes 153:8 produce 20:7, 8	produced 75:11 143:24 162:11 306:5 328:12 331:16 produces 306:18 347:17 producing 35:9 product 306:1 production 305:10 398:22 400:2 PRODUCTS 1:3 11:11 professional 34:17, 20 158:5 423:19 professionall y 389:22 professionals 157:24 158:2	professor 32:12, 16, 18, 20, 21 proficient 422:3 profiling 10:2 profound 24:7 44:23 197:7 profoundly 188:21 189:6 program 32:11 217:19 390:1 393:17 394:22 project 394:22 projects 392:21 proliferative 357:3 prolonged 110:4 promote 219:20 pronunciatio n 117:13 proof 63:16 102:21 105:8, 12 130:10 409:15 proper 229:3 properly 229:19 proportion 234:2 proposal 84:14, 16, 23	propose 215:10 277:8 324:21 proposed 319:22 320:20, 25 322:12 323:15 324:9, 13 325:4 proposing 83:16 proposition 133:1 135:13 propounded 447:6 prospective 10:9 44:22 45:5 46:4 47:7, 13 49:5 165:1, 12, 15 prospectively 47:5 365:20 protect 104:25 214:17 protected 214:25 protection 8:15 296:2 412:19 PROTECTI VE 1:6 16:12 51:22 88:20 214:5, 6 215:14 221:17, 22

protectively 215:11	391:24 405:9	publish 46:21, 23 51:10 91:24 218:12, 13 219:9 419:24	PURSUANT 1:6 put 15:10 18:20 20:2 51:2, 11 126:15 143:2, 4 165:8 222:12 237:18 263:7 284:13 319:19 320:18 338:2 357:7 368:17 372:12 391:4 396:8 410:24 429:10 431:18	quantitative 247:5 Quantitativel y 230:11 235:12 quantity 329:9 queried 127:20 217:25 query 127:2 137:5, 6, 19 431:11 querying 407:16 question 30:2 54:7 58:22 84:7 94:11 101:18 102:1 103:24, 25 127:4 147:9, 13 148:3 149:9 150:14 151:10, 15 154:3 160:14 168:22 190:24 196:1 207:10 208:18, 21 210:19 212:4 216:8 219:25 221:6 224:20 236:2 244:22 245:8
protectiveness 89:7	providing 191:5	published 12:18 30:23 37:20, 22 38:1 41:24 50:18 51:18 56:1, 2, 17 60:11 64:22 92:18, 21 109:12 179:13 218:17 220:12 285:12, 18, 20 350:17 412:3 415:1 417:15	putative 415:10 P-value 89:11 90:14, 19 p-values 89:14 90:3 < Q > qualifications 14:5 140:7, 11, 13 424:10 qualified 97:4, 6 quality 164:4 165:16 280:14 350:5, 21	
protein 431:16	provitamin 400:1	publishing 219:23 Puerto 3:7 pull 125:20 130:15 132:16 294:14 391:4 pups 345:24 pure 245:12 purpose 216:4 343:21 389:7 purposes 170:23 431:25		
proteins 8:14 296:2 412:18	proxy 236:23			
proud 394:15	public 145:3, 7 146:21, 25 147:25 148:17 149:14 180:22 216:25 445:23 447:19			
prove 269:20 432:7	publication 26:19 42:19, 21 46:16 48:23 55:23 56:1 129:17 179:17, 18 181:23 219:4, 6, 10, 11 220:6 313:2 371:4 420:7			
proven 148:25 398:10				
provide 55:11 72:12 102:18 105:1 113:8 114:20 183:7, 9, 12 184:11 215:13 223:2 280:17 343:7 361:1 386:5, 14, 18 405:11 422:5	publications 46:18 47:21 131:18 420:6 publicly 140:20 144:21 145:11 285:4, 10 391:21 417:16			
provided 18:9, 25 105:6 112:22 113:10 114:5, 19 342:23 423:10				
provides 132:8				

247:14	127:11	338:9, 16	428:22	tsguerra.com
254:9, 25	128:20	339:2	429:7, 17	3:5
262:23	133:13	341:1, 9, 17	433:22	race 225:18
291:20	141:11	343:2	434:6	raised 338:9
298:1	142:2	344:15	435:1, 11, 13	random
308:19	144:19	347:13	436:13	229:6, 10, 11
312:4	145:6	354:5, 19	438:1, 13, 22	rare 359:23
319:3	147:3	361:20	439:7, 15	360:1
333:7	148:7, 10	363:21	440:2, 8, 12,	380:5, 8
348:12	149:21	364:23	17, 19	rate 167:14
359:16	150:9	369:19	441:16	231:16
361:23	151:5	370:18	442:13, 19	363:25
362:20	162:21	375:5	443:25	364:1
365:2	163:19	376:9, 14	447:6	ratio 87:22
370:17, 20	164:8, 17	378:4	quick	211:19
373:5	167:3	379:6, 20	362:20	239:11
374:11	169:10	380:16	quickly	242:5
378:3	176:9	381:3	394:25	243:20, 22,
403:4, 12, 14	177:2	382:12, 22	421:19	24 246:3, 5,
404:6	184:3	384:11	QUINN	21, 23 248:7,
407:24	205:12	386:1, 24	5:22	18 267:21
408:4	208:4, 6	387:21	quite 48:5	268:1, 4
421:17	209:4	388:3	143:21	270:14, 22
428:1	222:8	392:18	219:19	rationale
437:20	244:6	394:9	305:12	341:21, 24
438:12	249:2	398:3	383:18	ratios
questionnaires	255:17	400:19	quote 117:6	384:18
352:1, 19	256:6, 16, 24	401:19	310:4	rats 189:21
questions	258:23	402:19	318:18, 23	RAYNE 5:7
10:4 12:2	261:17	403:11	319:6	rayne.ellis@a
13:15 24:3	266:23	404:8	341:15	rnoldporter.c
28:9 64:5,	269:1	406:12	349:10	om 5:7
20 66:7	279:10	407:2, 6, 19	379:16	reach 180:4
67:22	285:2	408:1	quote/unquot	282:21
74:13 82:2	298:23	409:20	e 213:1	371:19
86:16, 21	308:20	410:11	quoted	reached
91:11 97:1	312:24	411:19	63:12	48:15
98:1 103:6,	314:9, 16	414:19	quotes	read 98:3, 4
14 104:10,	320:17	415:6, 19	318:3	103:17
21 107:2	322:8	418:1		150:13, 17
111:3, 23	331:24	421:3, 23	< R >	153:6
116:2	335:8	422:23	rabbit 197:9	253:21, 22
118:22	336:1	424:2, 8, 24	rabney@wat	278:12
125:4	337:12	425:6, 16		284:8

309:11	reality	230:4	307:21	recommende
311:4	195:20	271:13	338:17	d 199:21
313:23	376:3	277:8	352:2, 4	288:4, 14, 17
319:10	realize	329:7	367:7	289:11
338:7	68:19 84:1	378:20	369:9	291:2
340:13	realized	409:4	425:21	292:14, 15
342:15	29:9 260:3	443:16	recalling	307:18
372:6, 23	really 36:14	REBECCA	352:16	400:21
412:15, 22	163:7	2:10 12:11,	receipt	record 11:2,
422:18	165:5	23 386:25	446:15	16 12:6
426:19, 21	171:11	rebecca.king	receive	13:19
432:14, 19	190:4	@kellerpost	436:4, 25	23:14
433:21	195:11	man.com	438:6	76:24 77:5
435:4, 9	219:16	2:10	received	86:10, 12, 14
446:3 447:4	220:14	Rebuttal	424:23	103:16
readily	230:9	8:18 50:13	438:18	115:15
203:12	275:14	66:25	receives	150:21, 23,
reading	340:24	111:24	435:24	24 151:1, 3
17:7 113:6	341:3	112:1, 2, 3, 9,	receptor	166:17, 19,
134:22	342:24	13, 25 113:3,	416:8	22, 24 167:1
254:21	377:5	5, 19 114:2	Recessive	204:8
269:8	387:13	120:9	9:3	208:14
289:22	Realtime	122:20	recirculated	255:11, 13,
315:3	1:17 395:4	125:23	252:15	15 290:20
317:16	445:2, 17	126:4	reckon 68:4	308:15
318:3, 4	reason	127:24	recognition	309:11
319:11	29:18 56:3	129:20	193:20	313:20
338:17	67:7	134:8	recognize	314:1, 3, 5, 7
376:21	113:18	137:25	128:24	322:7
429:19	144:9	139:10	173:15	353:24
reads 309:7	154:9	140:8	194:2, 4	354:1, 3
ready 70:12	261:7	145:24	277:18	365:7
86:18	287:22	146:4	278:4	387:14, 16,
151:6	312:3	177:4 286:7	recognized	18 426:21
167:6	438:24	recall 17:17,	173:11	444:5
234:23	439:1, 10	18 61:18	recollection	records
255:19	446:5	92:9 125:8	17:25	172:11
256:8	reasonable	148:15	273:15	RECROSS-
314:10	227:12	175:6	recommenda	EXAMINAT
354:7	423:7, 10	226:13	tion 335:14	ION 435:12
real 229:16	reasoning	250:14	recommenda	rectal
277:19	27:5	261:9, 18	tions	201:12
	reasons	262:18, 25	158:21	red 338:2,
	44:17, 21	273:16, 17	348:16	11

REDIRECT	285:11, 13	referencing	reflect	368:10, 23
424:1 440:1	299:12	159:13	223:20, 22	371:7
redox	300:23	261:6, 15	253:13	377:2
322:19, 20	302:8	262:1	303:23	380:3
reduce	323:23	290:10	reflects	386:19
327:25	333:17	301:2	253:12	419:9
400:9, 23, 25	339:3	375:18	282:11	434:3
401:3, 9	363:10	376:23	refused	441:15
reduced	375:3	381:23	438:5	442:18
214:9	405:7, 9, 11	417:1	refute	regarding
reducing	413:16	referred	374:21	93:7
307:5	417:1	20:19 24:5,	regard	163:19
reduction	419:9	13 31:14, 16	52:13	264:11
330:9	430:20	37:13 72:9	55:15 69:4	310:1
refer 13:24	434:5	89:19	73:20	370:10
14:2, 14, 16,	referenced	122:2	74:13	regardless
18 26:21	113:10	138:22	82:10	270:17
51:10	114:1	154:2	102:19	288:7
170:9	160:10	190:8	108:3	299:25
174:21	186:24	191:13	112:16	324:19
178:3	263:5	192:1	114:3	regards
202:21	289:9	199:4, 13	146:18	55:6, 24
312:10	290:4	202:5	149:15	62:14 63:1
340:4	299:7	237:21	157:9	68:2 78:19
368:10	300:22	243:9	180:8	79:14 80:8
402:6	413:19	249:13	181:21	82:8, 21
420:3	417:7, 14	266:4	186:5	85:23, 24
433:15	434:11	273:16	196:14	90:9 91:15,
reference	references	274:10	213:11	20 97:22
62:4 67:1	60:1, 12	393:8	217:25	120:22
114:16	61:24	referring	245:15	124:21
125:13, 18	114:3	28:11	249:22	139:16
129:4, 7	128:12, 13,	46:16	264:24	158:22
131:16, 17	15 298:14	67:16	273:21	159:19
133:21, 24	299:4, 9	182:21, 24	279:1	162:5
134:1	302:18	183:25	280:16	193:12
155:2	364:9	266:14	285:20	211:7
156:2, 7, 25	395:13	267:11	343:22	219:8
158:10, 17	402:25	333:18	345:12	221:18
174:16, 19	403:17	339:14	353:11	223:8
262:2	404:25	363:2, 4	356:4, 24	228:15
264:23	405:22	368:6	358:14	234:5, 19
278:18	430:18	refers 181:1	364:10	239:24
282:4			367:5, 20	243:5

251:21, 24	registries	rejecting	relevant	158:24
261:5	44:23	88:23 89:1	147:14	159:11
262:16	216:24	375:2	168:6	214:13
276:6	Registry	rejection	194:14	330:25
277:24	45:9, 16, 20	97:24	251:10	remain
280:18	46:20	relate 35:2	342:11	384:18
281:3	47:14, 21	137:2	reliable	remember
288:19	48:14, 24	141:17	186:7	50:8 62:20
294:10	49:6	related	350:10	96:2
303:3	163:21	18:10	351:1	101:18
307:2	164:7, 21	136:16	reliance	120:12
311:25	regular	193:24	28:18	122:24
318:14	50:23 74:1	316:13	114:23	125:11
325:12	94:15	RELATES	133:22	163:22
328:3, 14	103:1, 3	1:5 146:13	161:22	176:12
338:9, 25	170:1	relation	162:17, 19	177:3
340:15	174:11, 14	14:21	174:17, 18	182:22
342:18	regularly	34:25	185:12	183:4, 20
345:16	33:14	40:15	332:9	184:6, 9
348:24	46:23 48:3	172:11	relied	256:15
352:16	174:21	280:4	116:10	262:13, 14
355:2	Regulating	376:19	351:19	298:17
357:24	8:24	386:7, 19	370:7	299:19
360:16	regulations	relationship	relies	333:2
361:2	135:18	93:21	139:12	341:20, 21
364:3	regulator	107:18	272:25	380:19
365:15	288:9	155:20	356:10	381:5
369:7	regulatory	209:7	rely 58:24	390:22
371:14	108:17	386:15	121:19	391:1
372:12	277:17	395:20	159:5, 22	403:21, 25
379:23	278:4, 22	413:17	184:17	418:25
384:6, 20	279:15	relationships	205:5	419:4
395:22	287:19	107:21	222:19	424:12
400:15, 17	316:10	392:3, 23	240:3, 19	426:4
409:12, 24	337:19	393:9	272:24	432:16, 22
regeneration	431:25	relative	276:13	remove
303:24	Reilly 96:5,	48:6 87:23	310:8 327:7	17:15
regions	8	445:10, 11	relying	318:18
27:10	reiterate	relatively	56:18	319:6
Registered	352:3	168:1	63:15	346:19
1:16 445:2,	rejected	relayed	87:15, 17	357:20
16	96:23	349:3	129:20	434:24
	313:1, 7, 14	release	134:14	removed
		393:14	136:8	17:17, 19

82:23	repetitive	126:4, 19	355:18	reports
259:18	73:12	127:25	362:22	50:3, 9
261:8	193:8	129:21	363:16, 18	72:12
398:24	199:2, 8	130:20	364:6	107:9
434:23	396:25	132:13	365:23	111:25
removing	repetitively	134:9	370:11	114:8, 18, 20
319:5	193:5	137:25	396:5	120:8
render	rephrase	139:10	405:13	256:11
73:16	250:24	140:8	409:22, 23,	288:4
93:25	replaced	147:21	25 423:7	356:23
98:10	301:23	174:17	434:11	represent
102:16	replicate	177:4, 6	reported	222:13
105:21	276:23	189:14	37:14	241:14
180:12	replicated	204:3	75:14	299:2
279:2, 5	269:11	210:8	118:11	302:16
rendered	replication	222:20	120:24	313:12
97:22	269:13, 17	226:10	126:19	representatio
101:22, 24	371:14	256:13	134:23, 25	n 300:24
102:5, 12, 21	Report 8:18	257:1, 2, 7,	135:7, 20	representatio
104:13	9:15 16:18,	22 258:3	211:20	ns 300:7
105:2	24 17:2	259:7, 10, 13	242:12	representativ
112:16	18:3, 4, 9, 20,	261:11	247:6	e 199:5
140:25	23, 24 19:3	263:1, 11, 15,	255:2	represented
153:3 366:5	35:5 50:12,	20 264:6, 9	264:22	68:25
rendering	13 55:11	274:18	265:16	representing
100:11	58:25 63:6,	278:13	272:22	133:16
115:1	14 66:25	282:4	273:1, 10	represents
149:12	86:23	283:16, 20	274:22	129:18
179:25	107:25	285:14, 16	365:19	264:17
182:6	111:25	286:8	375:25	reproduce
184:19	112:1, 2, 3, 9,	289:15	408:8	422:4
rent 171:23	13, 15, 25	290:5	409:25	
repackaging	113:3, 5, 19	300:5, 20, 25	416:4	Reproductive
219:12	114:2, 6	307:12, 13	Reporter	420:22
repeat	116:15, 16,	309:2, 17, 22	1:16, 17, 19,	republish
94:11	25 117:4, 24	311:6	20 11:17	220:10
210:19	118:3, 25	319:21	151:20	reputable
219:16	119:22	320:23	445:2, 3, 16,	419:25
224:20	120:6, 9, 23	323:3, 22	17, 18, 19, 20,	require
247:14	121:2	330:12	21, 22	346:17
348:12	122:21	332:23	reporting	required
378:2	123:3	333:13	270:11	33:9 106:7
repeatable	124:21	334:16	272:19	293:13
269:23	125:15, 24	339:6, 19		

318:15	respect	restricted	returned	25 423:4
345:13	15:11	396:24	420:10	428:25
requires	30:19	restroom	Reveals	433:8
192:9	144:10	387:11	8:20 119:2	434:16
research	156:11	resubmitting	reverse-	reviewed
25:3 35:2	162:11	84:20	engineered	18:15, 23
37:19 42:2,	164:18	result 26:7	287:1	100:21
6 55:12	165:2	87:22 91:3	reverse-	113:3, 9, 25
56:5 92:10	266:9	213:4	engineering	130:8
121:14	313:1	249:21	287:3	132:6
170:22, 23	333:23	268:20, 24	review 10:4	144:23
171:14, 17,	369:25	resulted	30:16, 18	152:14
20, 21, 24	respectively	137:19	51:19	207:5
206:12	289:18	224:18	65:12, 14	276:20
315:7	respond	resulting	79:13	332:6
388:8	420:11	392:24	141:22	338:3
389:2	respondents	results	144:17	339:5, 7, 23
393:11	352:20	86:25	145:12	344:17
394:12	responders	87:15	151:12	350:1, 17
400:11	352:11	218:11, 12,	153:21	351:7
418:8	responding	18 219:12	155:9	360:23
420:21	175:3 353:6	221:16	159:2, 6, 7,	363:12, 15
422:2	response	264:1	12 184:12	365:11
423:18	114:18	269:9, 23	190:3	367:8 422:6
443:14	135:18	303:22	276:15	reviewer
researcher	147:19	résumé 53:8	313:5	315:21
149:10	154:2	retained	314:19, 22,	316:9, 14, 15
researchers	318:18	425:21	25 316:21,	342:10
51:13	319:4	retardation	25 317:3, 7	420:15, 17,
192:16	349:6	182:17	319:17, 18	25
217:16	409:11	183:20	338:1, 4	reviewers
researching	431:2	184:14, 18	339:4, 11, 18,	315:18, 22
414:22	responses	retested	21, 22 340:3	317:24
418:20	176:8 349:4	197:9	344:5, 10, 12,	319:5
	responsible	retinoic	18 346:18	340:8
resequencing	429:22	19:19 20:10	349:14	341:3
72:10	430:9		364:8	344:7
reservations	responsive	retrospective	365:2	350:3
342:18	35:11, 13, 15	45:1 165:13	367:25	420:2, 5, 7
residual	rest 113:15	retrospective	413:18	433:9
375:17	325:10	ly 47:6	419:20, 22	reviewing
resources	339:13	155:23	420:3, 8	29:8, 17
171:15, 17	385:3	return	421:7, 24	30:22
	423:24	446:13	422:9, 14, 18,	86:22

143:16	63:3 65:3	161:25	216:4, 6, 20	265:5, 11, 14,
260:11	68:8 69:9	162:3	217:1, 9, 19	21 266:3
338:10	71:10, 17	163:17	218:4, 5, 9,	267:3, 7, 11,
433:19	72:1, 6	165:16, 17	15, 20, 24	17 268:8, 11,
reviews	76:7, 9, 13,	166:1, 12, 15	219:1, 4, 17	17, 21 269:6,
151:25	22 78:7	167:8	220:2	24 270:5, 10,
revise	81:13, 19	169:24	221:25	13, 20 271:2,
116:18	83:7 84:4,	170:3	224:5, 8	3 272:2, 6
revising	10 88:4, 11	172:2	225:9	273:23
338:1	89:2, 21	175:19	226:3, 14, 23	274:20, 23
RFO 3:6	90:4, 19	178:24	227:24	275:9, 15, 19,
Richard	92:15	179:10, 15,	228:3, 12, 18,	23 276:7, 8,
41:9 425:18	93:13 96:1	19, 22	21 230:8, 10,	24 277:6, 14
Richey	103:5, 9	180:14	21 231:5, 10,	280:7, 20, 24
368:2, 7, 9,	108:14	181:5	20, 23, 24	281:19
25 369:5, 7,	110:11	183:4	232:1, 5, 13,	282:6
10, 16	111:18	185:6	17 233:12,	283:5, 10
Rick 389:14,	112:19	186:17	24 234:3, 10,	285:3, 21
16, 22, 23	113:13	187:3	24 236:4, 7,	286:3, 6, 21
400:10	115:12	188:1, 18	18, 21, 23	287:2, 9, 12,
424:9, 10, 15	116:14, 19,	189:15	237:15, 18,	16, 20
436:5	21, 23	190:5	20, 25 238:4,	290:13, 22
438:5, 16	117:10	191:23	9, 13, 17, 20,	293:11
Rico 3:7	118:9, 14	192:3, 8, 13,	25 239:5, 9,	294:3, 5
right 13:4,	119:18	18 193:16	13 241:11,	295:16, 19,
13, 22 14:25	121:3, 11	194:15	17 242:2, 10,	22 296:4, 6,
15:24 16:4,	122:8	196:7, 15	13, 18, 22	14, 16, 20, 24
19 20:13	123:12, 18	197:3	243:4, 13, 18	297:3, 7, 16,
22:3, 8	127:7	199:7, 11	244:3, 16	19, 20, 22
24:12	128:10	200:14	245:12, 20	298:5
28:25	130:21	201:2	247:6, 24	300:1, 14
29:21	132:24	202:9, 15, 19	248:13	301:1, 5, 13
30:17 34:1	134:10, 15	203:9, 11, 16	249:19	302:19
35:18 36:8,	136:5, 22	204:18, 23,	251:20	303:5, 17, 19
20 37:9	138:11	24 205:3, 6,	252:3, 8	304:2, 3, 8,
44:20	140:14, 18	15, 18 206:3,	253:7, 16, 21	11, 18 305:1,
45:16, 23	145:25	11, 17, 24	254:4, 19, 23,	16, 18
46:5, 6, 10,	146:3, 7	207:6, 11, 15	24 255:2, 25	306:14
13, 18, 22, 24	152:16	209:18	256:7, 20	307:10, 19
48:15, 19	153:13	210:17, 18	258:13, 18	308:24
49:18 54:5,	154:13, 21	211:11	261:15, 24	310:9, 14, 16
10 56:19	155:12, 15	213:10, 18	262:10, 22	311:6, 12, 15
57:13 59:8	158:1	214:11	263:17, 22	312:18
60:13 61:5	159:3, 20	215:9, 25	264:1, 13	315:19

316:6, 16	370:1, 7, 11	433:5, 19	281:4, 18	12:12
317:3, 11, 13	371:15	434:9, 12	282:25	13:20, 21, 25
319:2, 19	372:20	435:2	283:7, 10, 11	96:18
320:11, 23	374:10	436:24	285:6	103:12, 13,
321:5, 9, 13,	375:21, 22	439:24	303:15	22 147:8
16, 18, 22	377:16, 21,	440:5, 25	307:1	168:3
322:1, 3, 4	23 379:9	442:3, 15, 20,	322:24	175:23
323:1, 12, 17,	381:4, 18	22 443:7	328:1	284:8
19, 22 324:1,	383:1, 4	Risk 9:12,	334:7	313:23
6, 17 325:16	384:1, 12, 15,	21 10:2, 12,	336:18	421:20
326:4	22, 24, 25	15 48:7	356:14	437:13
327:2, 17	385:5, 20	76:6 78:11,	358:6, 14, 20	445:4
328:19	386:22	16 83:13, 15,	360:3, 5, 10,	447:12
331:13, 17	388:6	23 87:23	12 361:8	robust
332:5, 6	390:8	88:8, 9, 16,	362:8	391:21
334:9, 14	391:9, 12	18 89:9	367:20, 22	rodent
335:1, 9	397:4	98:12	374:9	170:2
336:2, 6, 12,	399:15, 23	109:10	375:9, 24	193:18
19, 24	401:9	124:20	383:10	rodents
337:15	402:23	136:3	384:5, 8	170:18
338:21	403:1, 2, 24	139:6	385:6	ROGER
339:11, 24	404:3, 10	157:8, 11, 12,	390:17	3:22
340:3	406:3, 13	13 160:5, 20,	399:8	roger.smith
341:7, 12	407:3, 8	21 211:21	400:9, 16, 23	@beasleyalle
342:6	408:2	213:12	401:1, 3	n.com 3:23
343:7, 23	409:21	214:10	402:15	Role 8:21
344:2, 7	410:16	215:3	416:18	42:8 175:2
347:16	412:22, 24,	221:7, 21	risk-benefit	414:3, 6
348:11, 21	25 416:11	232:16	336:11, 13	415:10
349:1, 4, 9,	417:11	234:25	risks 221:9	roll 387:8
22, 24 351:3,	421:3	235:2, 7, 8,	229:22	ROMANO
6, 15, 21	422:10	19 239:21	249:24	2:13
352:10, 12,	423:5, 23	240:13, 16,	280:4	room 236:6
23, 25 353:2,	424:17	25 243:21,	281:15	ROSIE 2:13
8 354:6	425:2, 8, 14	25 246:1, 2	362:11	rosie.romano
355:21	426:11, 14	248:6, 11, 19	379:4	@kellerpost
356:15	427:2, 8, 12,	249:14, 21	Rite 6:9	man.com
359:3, 10, 15,	15, 24 428:6,	254:8	Riverside	2:13
21 362:23	11, 18, 24	260:23	2:16	rounds
364:7	429:23	261:1	rivm 316:12	254:15
365:23	430:1, 5, 8,	267:20	RNA 405:9	255:6
366:21, 22	11, 14, 19, 22	276:3	Robert 1:11	route
367:18	431:7, 10, 23	279:13	8:18 9:15	203:25
368:15, 24	432:1, 3, 25	280:8	11:14, 20	337:11

routes	Santos 8:25	154:13, 17	427:9, 11	389:6
201:11	125:7, 12, 13	158:16	430:18, 20	393:19
row 214:1	128:10	171:20	scale 165:25	scientific
383:4	129:5, 7, 18,	210:15	scaling	60:22
rows	23 130:12,	218:10	287:5	147:11
244:24	16, 19	235:21	288:20	398:6
270:24	176:18	251:16	289:1, 20	403:5
Rule 8:18	419:10	255:4	290:25	420:1, 13
9:15	SARAH	304:12	291:18	421:1, 11, 12
run 72:8	4:10	305:17	292:9, 22	423:7, 11
91:8	sat 319:13	333:2	293:3, 14, 15,	431:24
217:15, 16	satisfied	341:3, 22	25 294:8	scientifically
346:10	116:9	344:18		230:1, 5
running	satisfies	352:7	Scandinavian	scientist
218:6	103:25	374:24	216:15	14:9 108:11
RUSS 3:5	Saunders	416:6	SCARCELL	scientists
	258:3, 13, 16,	says 11:23	O 3:11	81:9, 17
< S >	17, 19 259:2,	59:24 61:6,	scare 147:5	82:13
sacrifice	16, 17, 19, 20,	12 119:9	148:19	107:23
38:22	24 260:8, 9,	126:4, 19	schizophreni	108:3
safe 286:12	12, 14 261:7	128:3	a 416:1	282:18
287:2, 15, 20	savant 74:7	130:11	school	338:19
288:12, 24	185:7	132:5, 7	32:11	436:15
335:7	save 423:23	135:2	40:22 41:2,	scope
safe-in-	saw 60:1	136:21	8 42:6, 9, 12	163:11
human	61:19 75:9	154:8	44:7 85:2	score 73:18
293:17	132:18	160:1, 18	173:24	210:16
safety 147:1	152:13	181:23	388:20	211:3, 8, 16
293:13, 21,	161:22	210:24	SCHULTZ	212:1
23 294:4, 7	179:2	212:21	2:14	213:9, 12
salary	213:10	232:6	Scialli	214:2, 3
168:12, 15	286:7	244:24	180:20	221:18
sampled	293:7	253:25	182:3	402:22, 23
226:6	307:14	280:2	science	406:22, 24
samples	353:2	286:20	33:12, 19, 22	407:7, 11, 21
218:1, 3	386:12	295:15	83:6	408:7
sampling	433:9, 18	302:22	147:14	scores
308:9	saying 40:2	335:19	163:3	408:20
San 33:3	61:11	347:25	195:15	scoring
sand 87:10	83:14	362:25	269:22	73:25
SANDRA	100:25	371:25	338:19	screen
5:1	104:11	392:10, 20	394:16	391:5
Santa 4:5	129:8	393:13, 14,	sciences	410:25
	135:11	17 413:17	14:7 156:4	

426:18	239:14, 17	126:11, 12	304:16	seen 38:7
428:14	240:22	128:3, 5, 15	310:10	39:15
screenshots	242:1	129:2	311:16	51:14 52:5
391:9	245:17, 21	133:19	315:17, 23	75:6, 7
scroll 395:1,	247:9, 20, 23	134:3	317:6	90:3 98:2
10 396:3	248:16	142:6	318:22	141:15
se 295:25	302:2, 15	145:13	323:8, 10	142:13, 14
323:10	347:22	151:16	328:13	144:24
342:16	348:5	152:3, 20	329:3	145:3, 7, 10,
345:21	381:10, 13	157:21	333:17	16 146:8, 11,
sealed	383:23, 25	169:4	338:1, 10	15 149:24
184:1, 4	392:9	171:18	339:4, 25	150:2
SEAN 2:3	410:2, 22	174:19	340:2, 11	152:21
147:21, 24	secondary	177:17	342:10	162:18
168:9	315:22	179:7	347:25	178:23
208:3	316:8, 15	182:20, 23	348:20, 23	179:20, 23
284:12, 25	second-pass	183:2	349:18	235:22
320:5	203:4	192:21	350:11	247:7
387:2, 25	section	196:12	352:17	299:10, 23
401:11, 18	34:16, 17	197:22, 25	356:19	313:3, 9
403:9	244:24	199:1, 15	359:13	319:16, 18
421:15	257:13, 22	200:16	364:14	321:6
424:16	260:21, 24	210:23	365:17	326:16
436:20, 22	264:4	219:14, 18	370:3	328:8, 11
Sean's 387:1	299:4	221:8	371:1	332:7
search	323:2	226:1	373:18	338:5
395:4	333:12	233:17, 22	381:15	355:1, 9, 17,
396:6	362:23	240:14	383:18	23 356:2, 9,
412:10	365:4, 18	242:1, 4	386:9, 10	23 357:7
413:6	373:3	247:4	396:1	360:11
searches	392:10	248:4	401:21	361:7, 10
418:21	433:14	253:9	402:20	364:2, 11
searching	see 32:3	257:19	403:19	376:5
65:9	39:4, 23	258:5	404:10	427:11
second	41:21 48:5	264:3	408:15, 18,	430:22
21:21	51:15	266:2	19 413:7	437:7
22:15	57:16 60:7	270:2	415:8	441:20
23:23	76:24	274:25	421:16	seizure
42:20	79:10, 13	278:15	427:4	336:24
127:3, 23	105:16	294:14	428:12	select
131:6, 9	112:10	295:14	430:7	123:13
152:4	114:8, 11	299:8, 11	441:18	selecting
207:17	123:22	302:21	seeing 28:25	288:19
220:8	124:11	303:1	seek 105:25	

selenoprotein s 412:18	sequentially 323:7	shared 107:6, 14, 18	252:12	sibling 9:19
seleno-	Series 8:13	193:1	260:10	265:21, 24
proteins	361:20	271:17	274:9	267:6, 14, 23
8:15	sertraline	shareholders	290:3, 21	268:9, 10, 15
send 72:10	92:3, 5, 6	53:19, 20	298:18	269:2
113:24	95:9	shares	422:12	270:16
170:20	serve 343:21	432:19, 20	427:22	271:10, 16
284:25	SERVICES	sheet 446:6,	429:23	275:20, 21
313:24	1:21 7:2	9, 11, 14	430:3	276:24
sense 401:7	11:4	447:7	432:13	277:17
sensitive	set 49:15	short	showing	280:2, 23
197:9	59:5 89:15,	395:24, 25	231:2	283:3
250:12, 16	18 90:20, 21	426:3	274:14	sibling-
sensitivity	198:12	shorter	319:17	based 278:1
23:23	199:3 445:8	395:22	363:23	sibling-
sent 84:19	setting	Shorthand	402:5	control
115:8	60:15	1:18 445:3,	403:16	278:4 285:5
170:22	62:11 90:23	17, 19, 20	shown	sibling-
420:2	seven 13:2	shortly	19:18 20:4	controlled
sentence	275:10, 16	229:1	22:19	276:14
118:7	385:4	short-term	35:13	278:5
371:1	seven-day	160:19	43:24 76:6	siblings
373:18	275:17	show 35:10,	78:15	266:5
375:7	severe 24:8	13 89:6	140:2	272:1, 2
376:16	139:12, 24	103:7, 19	179:21	277:11
381:13	190:14	104:12, 24	252:21, 22	sib-pair
386:4	361:18	105:2, 10	307:4, 9, 11	272:20
392:20	severity	119:8	328:2	281:5, 18
393:14	362:6	125:12, 17	330:17	282:3 285:8
433:13	sex 211:11	130:16	376:5	sib-paired
sentences	225:23	145:18	400:9	280:15
371:25	SFARI	178:19	401:2	sib-pairing
386:4	122:3, 6	276:10	402:14, 16	281:15
separate	SH 412:17	299:3	404:21	sic 143:10
305:17	SH(thiol)-	319:1	shows 28:5	284:10
separating	group 8:14	379:18	88:4 136:1	392:24
277:25	SHANNON	384:7	204:11	side 170:8,
September	6:23	404:2, 9, 25	249:12	9 295:13
9:22	shape	428:3, 8	396:17	sided 105:16
371:22	433:25	showed	397:8	sides 417:6
372:8	share 391:5	44:23 85:4	404:12	sign 128:4
sequencing	424:10	176:12	405:12, 14	381:24
72:9 75:3, 5		248:5	407:17	428:25

446:8	20, 23 271:3,	sit 130:14	291:11, 13	Society
signal 326:8	9 350:8, 24	207:13	301:20	24:12, 14, 15
signalling	383:7, 13	363:4	smaller	108:17
194:23	384:10, 15	site 414:9	378:17	143:10
324:5, 13, 14	385:5, 7	sitting 78:1	smell 194:5	146:7, 9
415:24	signing	80:1 91:13	smells 194:1	149:4
416:8	446:9	95:11	SMITH	179:13
signals	signs 28:1	103:18	3:22 6:4	180:11, 13,
340:17	siloed	116:18	smoked	21 182:1
signature	344:14	172:7	233:21	sociodemogr
116:23	similar	178:12	smoker	aphic 375:1
signed	67:19 69:3	206:14	233:21	solid 151:25
126:18	75:20	209:5	smokers	153:9, 15, 18,
significance	192:21	situation	234:1	22 154:14
48:16 87:5,	197:25	265:19	smoking	355:15, 16,
16, 19, 21	198:1	six 53:7	225:20	19, 20
383:22	217:10	134:7, 13	233:16	356:19, 21,
384:24	229:6	251:19	234:5, 10, 12,	23 357:4
significant	242:2	304:20	16, 20 235:5,	somebody
39:18	262:16, 21	323:21	8, 17, 23	74:6
46:22	301:18	six-hour	358:8	172:18
48:24 49:4	326:23	304:18, 23	362:17	194:4
87:1 88:3	368:16, 20	sizes 213:3	366:24	208:16
168:18	393:5	sjohnston@b	snapshot	229:24
211:4, 7, 9,	394:23	tlaw.com	226:22	233:21
17, 20, 22	simple	4:10	228:8	271:6
213:10, 13	301:10	skipped	230:10	313:24
214:7, 9	simply	294:4	236:14	315:11
215:19	130:16	skipping	239:3	343:4
221:4	159:13	245:2	SNIDOW	410:23
234:1, 4	221:19	sko@btlaw.c	2:15	421:1
239:20	235:21	om 5:2	soak 307:24	someone's
242:3	281:24	slightly	social 73:13	431:18
243:18, 20,	287:4	361:22	74:9 194:7,	Sonia 45:13
23 244:2	304:12	slogan	17, 18 195:4,	Sorry 13:3,
245:19, 25	327:15	389:10	17 199:2, 9,	7 92:4
246:2, 4, 6,	416:14	small 85:16	12, 17, 18	176:21
10, 18, 20, 22	single 39:5	201:22	373:8, 20	212:17
247:11, 22	370:21	202:24	374:13	231:17
260:23	singular	213:6	socialization	240:4
261:1	197:20	227:2	39:23, 24	244:23
267:22	sir 12:9	241:19, 20	193:21	262:22
268:2, 5	14:5 438:3	248:13	342:9	264:2
270:5, 10, 12,			396:23	265:25

274:13	speaks	333:16, 17	369:5, 8	214:16
284:17	187:5, 12	340:22	393:25	215:4, 11
302:3, 4	271:6, 10	364:2 369:6	415:3	square
319:23	281:2	Specifically	Specificity	294:1
320:8	special	17:16	180:7	SSRI 97:16
348:22	346:12, 14	21:12, 24	specifics	99:15
373:11	specialist	22:6 26:11	317:16	SSRIs
385:2	157:19	37:3 40:14	369:13, 16	91:11, 13, 15,
391:15	specialty	56:20 57:5	specified	17, 20, 22
412:14	173:1	58:18 69:2	201:16	92:1, 24
439:5	species	80:9 82:10	specify	93:7, 22
sort 53:2	197:5, 10, 15,	92:13, 20	123:9	94:1, 4
321:22	23 343:17	109:11	Spectrum	96:10
322:14	species-	113:10	8:23 9:3, 5,	99:12, 22
371:14	specific	121:9	9, 13 25:11	278:21, 24
431:12	197:13	124:14	309:13	279:3, 6, 21,
sorted 408:6	specific	126:3	310:6	22
sorts 148:4	20:6, 17	132:7	396:15, 18	stabilize
sound	55:12	135:5	398:8	337:9
216:20	56:24	137:11	399:6, 9	stack
255:22, 23	62:14, 19, 25	178:18	413:23	112:21
364:12	63:1, 13	181:24	414:3, 7	116:4 257:8
sounded	70:4 75:16	186:14	415:12	stand
317:17	82:8 107:1	191:9	416:10, 16	116:16
sounds	121:25	203:5	speeches	133:1
317:9	122:16	224:11	147:16	143:6
South 6:2, 8,	135:7	235:25	spelled	235:14, 16
18	137:6, 21	250:15	292:20	326:18
	141:25	271:12	spend 195:3	378:14
SOUTHERN	157:7	285:19	414:21	424:3
1:1 11:12	158:19	298:12, 20	spent 138:2	standard
SOVIK 6:4	181:14	299:6	195:1	158:17
SOX2 324:6	182:12	303:2	spillover	292:2
space 446:6	188:7	312:7	259:23	420:13
SPALDING	193:12	313:7	split 237:22	422:2, 7
5:12, 14	199:6	325:22	spoke	stands
speak	200:8	333:4	108:20	130:12
271:12	219:18	338:25	439:5	135:12
312:7	226:1	348:23	spoken	staple
357:24	250:3	353:13	175:22	295:12
speaking	283:1	357:24	337:2	stapled
59:13 91:7	293:24	360:11	sporadic	295:11
141:24	322:24	361:12	210:24	start 12:24
168:1	325:21	367:5, 7	213:22	21:19

47:18 91:9	19 350:13	225:19	198:1	297:1
117:9	358:13	stay 336:16	346:15	298:4 299:8
197:22, 25	375:16	stem 170:12,	407:17	strictly
210:22	statements	14 330:4, 8,	strengthen	276:11
259:1, 25	63:13	10	139:21	326:10
296:15	372:23	stenographic	199:23	strong 47:7
306:25	STATES	11:16	strengths	195:15
320:10	1:1 11:12	stenographic	357:21	223:3
390:13	166:6	ally 445:7	373:2	280:18
396:11	332:14	step 57:8,	stress 8:16	stronger
418:20, 21	389:6	18 58:3, 4	58:2 116:7	140:3, 4
started	400:22	59:1, 6	225:20	structural
12:11 13:6	statistical	297:15	296:3	20:12
19:5 25:9	87:4, 16, 19,	steps 56:15	297:17, 22	26:15, 25
36:6 92:16	21 89:22	200:15	299:16	27:11, 25
112:19	90:21 91:4	372:12	304:3	28:4, 6
156:17	383:22	411:17	310:1, 3	69:5, 11, 12,
195:6	384:23	stick 204:24	321:2, 8, 11,	16
324:15, 19	statistically	STONE 6:9	13, 17, 21	structure
334:16	39:17	Stoner	322:13	79:1
424:7	86:25	26:20	323:15	stuck
starting	211:4, 22	stop 201:20	325:8, 18	334:24
423:20	214:6, 9	392:8	326:4	student
state 12:5	215:17	401:13, 17	328:2	34:16, 17
13:18	239:19	436:15	329:12	389:24
23:13	242:3	437:11, 21	412:19	students
318:5	243:18	stopped	stressing	34:13, 15, 20
394:17, 20	244:2	443:20	306:13	174:1
431:22	245:19	Stores 5:20	stressor	418:11, 12
446:5	246:2, 4, 6,	stracey@trac	58:20 61:9,	studied
stated	10, 18, 19, 22	eylawfirm.co	13 62:11	21:8 71:16
136:18	247:11, 22	m 2:4	297:8	117:19, 22
statement	267:22	stratification	298:10	130:3
129:20	268:2, 5	226:1	299:14, 19	224:4
145:4, 15, 17,	271:9	stream	302:20	228:2
24 146:5, 8,	383:7, 12	414:9	304:11, 14	350:23
15 149:24	384:9, 15	Street 1:13	305:6, 11	studies 24:2
152:19, 25	385:5, 7	2:5, 23	306:14, 16,	30:22 36:3
153:1, 12	statistics	3:23 4:16	20, 21 307:7	37:25
154:4	86:21 87:8	5:2, 8, 23	stressors	42:13 45:1,
279:1	240:23	6:2, 8, 13, 18	57:18, 23	5 47:18
303:1	241:5 273:8	147:17	59:11, 15, 19	49:16, 17
330:18	status	strength	60:2 61:16	70:2, 15, 19
348:10, 13,		197:22	62:3 63:23	71:13 81:1,

8, 16 107:24	341:6, 22	176:13	297:9	Subscribed
109:19	342:24	177:9	301:14	447:15
113:11, 12	344:4, 6, 21	185:25	307:21	substance
115:6	345:10	186:19	319:16	261:24
124:1, 2	348:25	190:19	331:2	447:7
132:10	349:7	204:10	345:3, 8, 11	substantiate
154:9	350:4, 7, 17,	205:3, 18	347:1	331:3
162:5	20, 23 351:5,	209:17, 20	355:1, 3	substantive
165:12, 13,	25 352:18	210:14	364:6, 12, 14	17:24 18:1,
15 166:4	353:1	212:23	365:19	5, 6 256:20
198:20	357:25	213:3, 5	366:16	261:10, 12
200:3, 10	358:2	214:14, 22,	369:15, 25	262:8, 25
201:15	363:23	23 215:9, 17	370:21, 22	263:3
203:22	364:2	217:8, 11	371:6, 11	264:14, 16
204:6	367:1, 8, 12,	220:7, 25	372:15	subtypes
205:1	25 368:1, 21	222:14	374:16, 24	415:13
216:13, 18,	370:23	224:8, 11	376:20	Suffice 39:4
19 217:5	371:17, 25	225:17	383:1	sufficient
218:6	372:11	227:15, 16,	386:3, 13, 17	138:23
219:15, 19	374:20, 22	19, 21 228:1,	405:11	139:4
220:2, 14, 15	375:21, 25	4 230:16, 17,	415:1 419:8	233:14
221:21	385:9	19 249:2	studying	370:22
222:23	403:19	250:7	36:22, 24	375:24
223:5, 10	406:5, 14, 16	251:2	37:1, 3	suggest
252:12	417:2	253:5, 23	291:4	279:25
257:14	Study 8:18	255:5	334:11	suggested
265:15, 16	9:20 10:1	258:3	414:21	293:12
268:14, 19	28:11, 19, 25	261:6	stuff 105:14	suggests
269:11	35:9 39:18	262:1, 2, 10	115:3	157:11
271:20	40:23	263:5	155:11	160:20
272:23	42:11, 14, 16	265:7, 18, 22	166:13	SUGNET
273:6, 11	47:7 80:21,	266:8, 14	184:12	6:4
274:21	23 84:12	267:5, 8, 9,	307:15	Suite 1:13
276:14	89:5	11 268:10,	subject	2:5, 16 3:6,
277:23	117:19, 25	11 272:4, 7,	446:10	12, 17 4:5,
278:9	118:4, 12	24 273:5, 19	submitted	12, 16, 21
293:22	119:1	274:18	16:18	5:2 6:8
300:23	121:10	276:16	101:16	sulfhydryl
301:3	123:24	278:16, 19	256:12, 14	295:23, 25
321:6	124:6, 9, 12,	280:3, 9, 21	314:21	296:1
328:15	17 132:6, 12	282:21, 25	315:8 421:6	summary
339:5, 18, 19,	133:8, 10, 24	283:8, 15, 19,	submitting	157:6, 8, 12
21, 23	134:24	25 285:6	15:13	158:24
340:24	136:2	291:7		160:4

summer	410:13	299:22	sworn	231:6
6:23	422:9 435:6	301:17, 21	11:21	236:8
superior	Supported	316:12	445:4	260:6, 13
278:5	8:23 23:25	318:24	447:15	264:13
supersonic	29:12	345:20	syllabus	265:2
191:19	60:22 80:9	348:4	32:5	270:1
supplement	85:11	352:15	symptom	292:8, 23
12:20	105:4	362:7, 21	185:25	382:24
116:15	109:13	364:3	327:4, 8	383:1
120:13	393:17	378:5	328:22, 23	386:11
	394:3	427:10	382:14	tables
supplemental	406:6, 15	439:8	symptomatic	176:15
18:9, 21, 23	418:16	surface	186:8	177:10, 12
50:13	supporting	289:18	symptoms	178:14, 16
116:16	81:25 87:4	surprise	9:10 77:4	221:8
117:4, 24	128:13	229:17	187:1	261:20, 22
126:10	supportive	234:8	342:11	262:17, 19,
129:25	85:16 223:2	surprising	366:2	21, 24
134:8	supports	268:21	syndrome	tabs 397:3
176:15	331:5, 9	surrounding	260:7	take 25:1
177:9, 12	356:2	80:22	Syracuse	29:5 42:9
285:16	supposed	148:13	6:8	48:4 84:3,
supplements	180:13	surveil	system	4 98:7
132:3	352:15	217:13	22:12, 13	122:24
supply	supposition	surveillance	58:6 73:18	125:16
400:25	136:4	217:13	191:5	127:12
support	sure 13:12	survey	193:24	134:17
27:20	46:14 86:8	351:16	217:23, 25	150:16
79:15	89:10 91:1,	surveying	322:23	182:2
93:23	24 92:18	352:8	346:16	200:13
100:21	94:12	surveys	systematic	213:21
109:19	114:14	351:15	30:16	222:9
154:18	142:3	352:19	344:12	249:2
205:6	145:16	susceptible	systematicall	254:11, 18
244:9	148:9	20:22	y 29:9, 16	255:10
318:21	204:15	suspect	79:12	266:16
319:9, 14	209:19	359:20	systems	280:6
349:15	210:20	suspicious	20:21	298:24
355:2, 10	212:5	359:3, 9	325:14	313:11
393:16	216:9	swallowed		316:20
404:25	224:22	252:14	< T >	320:12
406:16	229:12	swear 11:18	Table 210:6,	331:13, 19
409:8	234:16	switch	9 221:3	337:20
	247:16	337:4, 7	230:23, 25	343:10, 23

351:10	talked	292:5	83:16	teratogenic
353:18	71:22	294:24	118:24	20:22
365:1, 13	148:11, 24	304:18	155:24	22:10
387:4, 10	163:20	320:10	156:1	23:15 92:13
400:22	172:19	327:12	168:19	teratogens
takeaway	176:11	342:8	230:2	20:6, 13, 23
342:16	182:9	347:23	235:14	44:2, 5
taken 15:15	185:6	390:25	254:20	67:18 68:3
110:13	248:20	417:11	282:17	teratologic
223:11	256:11	talks	284:14	19:15
225:14	314:17	295:15	318:25	21:13, 16, 25
231:4	315:9	324:5	331:11	22:2, 6
251:20	321:1	tall 395:22,	332:12	24:12, 14, 15
273:18	346:7	24, 25	343:25	teratological
288:1	348:8	taller 257:8	363:7	19:22
358:4	358:7	tanks	365:2	teratologist
424:15	369:23	192:23	385:16	158:18
445:7	370:11	Target 5:25	396:16	190:7
takes 201:2,	380:17	185:11	397:7	274:4, 25
21 229:24	395:16	186:8	401:20	275:15
talk 19:10	397:12	taught 32:5	415:20	385:19
26:3 28:24	399:11	33:14, 17	421:24	390:7
47:19 48:2	talking	tcampbell@k	423:12	teratology
67:25	31:12 40:5	rauseandkins	430:15	15:24
111:9	47:18 48:9	man.com	telling	19:11
121:4	49:2, 3	3:17	155:23	77:20, 22
142:4	52:16	TCE 183:21	178:13, 15	108:17
161:17	54:20 68:9	teach 31:2,	temperature	138:12
163:24	108:10	15, 17, 18, 19,	85:3	143:8, 9
179:10	111:1, 11	20, 21 32:25	temporality	158:6, 11
180:17	117:9	33:9, 25	351:23	169:12
181:22	127:24	34:8, 9, 17	temporally	174:11, 14
191:16	154:6	121:21	351:24	179:11, 12
195:12	164:5	173:25	ten 401:5	180:11, 21
200:9	169:23	268:12	tend 20:20	182:1
244:8	176:17	418:10, 12	158:20	202:21
282:18	177:4	teaching	tendency	390:11
285:21	189:9, 11	33:2, 3, 11,	241:9, 16	398:6
306:3	203:9	19	tenfold	term 59:7
354:10	204:4	tease 111:16	293:20	terms
358:1	223:14	techniques	Tens 120:19	238:24
410:17, 20	230:14	192:15	tera 23:15	267:17
435:15, 19	237:3	tell 11:22	teratogen	347:2
	253:10	27:9 71:3	22:17 43:18	366:18

399:12	438:5, 25	tests 74:23	429:8	265:7
407:10	439:12	91:8 170:3	439:24	285:18
tertile	441:3, 8	171:1, 4, 6	444:3	things 17:9,
238:17	442:1, 5	195:8	Thanks	11, 12 37:15
239:8, 14, 17	443:6 445:4	199:5, 21	150:8	39:16, 21
240:12, 22	testifying	223:13	166:15	59:2 60:14
242:1	106:18	346:7, 12	444:1	85:11
245:17, 21	401:14		theoretical	155:25
246:8, 15	426:4	tetrachloride	195:19	158:8
247:9, 21, 24	436:5, 16, 21,	62:10, 16	theories	161:18, 20
248:16	22 437:2	299:18	195:11	162:21, 25
tertiles	438:17	300:9	theory	170:4
237:22	443:21	301:5, 7, 17	105:4	193:21
238:22	testimony	302:23	195:14	203:17
242:21	22:1 26:24	Texas 1:14,	308:9, 10	204:13
243:5, 8	61:5 62:12	18 2:6	321:10	228:2, 4
test 73:8	63:9	11:9	322:3	244:8
166:7	104:22	204:16	329:6 331:4	265:23
199:14	114:13	388:17	therapeutic	269:14, 20
346:8, 9	183:14	390:1	354:20, 22	277:13
418:9	256:18	445:20	355:7, 12, 24	300:19
tested	281:9	text 258:9	357:9	312:18, 19
293:18	330:6	319:24	thereabouts	317:5
398:12	379:17	431:12	167:21	323:24
testified	404:4	text-based	thereof	325:13
74:24	437:10, 18	431:11	278:24	331:14
99:17	445:7	textbook	thimerosal	354:10
109:14	testing 25:8	156:2, 7, 23,	77:23, 25	358:5, 9
110:25	38:9 69:8	24 158:11	78:2, 3	359:6
147:24	70:23 72:5	173:12, 19	79:22, 23	365:22
174:9	90:21	textbooks	80:2, 9, 12	366:6
182:16	166:11	173:14	81:2, 9, 18	367:9
183:1	170:20, 21	texts 159:14	82:4, 8, 10,	401:4
250:10	187:8	174:19	13 148:12,	426:19
280:7	191:12, 25	Thalidomide	13, 18	think 12:11
378:11	192:12	197:6	149:12	19:5 23:22
425:7	194:18	Thank	thing 117:2,	24:15
426:1 440:3	223:13	13:14 66:5	21 154:7	28:10
testify	311:7, 9	161:16	191:22	34:23
98:20, 24	312:8	242:7	219:16	44:10
251:11	346:3, 4	255:10	220:11	47:25
253:1	430:25	284:24	221:23	48:20
284:13	431:1, 2	383:16	226:21	51:19 53:7
403:9		423:24	253:24	58:22, 23

70:25 72:4	305:4	347:21	396:21	239:4
77:13, 19	318:2	370:18	398:19	249:8
82:20 83:2	323:20	371:25	413:24	251:19
84:6 96:21	331:14	383:23	three-	255:14
97:12	335:3	third-hand	chamber	274:9
99:14	343:6, 13, 19,	442:14	39:22	275:2
108:22	25 360:15,	third-line	199:14	277:5, 12
109:14	24 361:16	48:10	346:8	289:10
110:16, 18	362:14	thirds 238:7	threshold	308:8
111:19	363:1	thirty	238:2, 3	313:12
114:11	369:6, 13, 15	446:15	throw	314:6
116:12	379:22	THORNBUR	436:14	320:12
119:11	380:3	G 4:6, 15,	time 11:6, 7	334:21
139:24	387:3	17 5:1	20:15 21:1	343:8
144:16	395:16	thought	23:15, 22	348:9
148:24	408:11	12:21	29:5, 6	349:16
152:11	410:18	74:25 75:7	30:3 40:13	354:2
166:9	416:25	111:7, 12, 14	43:3, 12, 22	369:20
167:10, 19	422:13	193:23	44:6 46:21	371:5
173:18	425:23	206:8, 10	51:16 72:1	378:15, 16,
175:11	436:7	207:21	81:12, 14	23 385:10
178:23	437:19	208:11	82:4 86:13	387:17
182:5	thinks	282:20	94:5 98:4	414:21
187:4	336:6, 9	345:5	99:16	426:3 445:7
188:19	thiol 57:4	371:16	101:2	times 20:17
195:18, 19	297:7	397:14	102:1	45:14 50:4
201:12	412:17	415:24	110:4	67:1
206:6	thiols	three 36:13,	111:4	101:13
216:17	296:22	14 37:4	117:5	219:24
218:22	297:21	119:23	119:20	289:17
230:19	306:12, 15	170:4	122:19	303:10, 13
244:8	third 21:21	220:13	134:17	389:13
245:9	22:15	237:13, 19,	151:2	417:14
257:24	57:17	23 238:4, 13,	155:17, 25	435:18
258:14	225:3, 6	17 244:16	166:25	timing 10:8
280:16	238:17, 22	275:13	167:11	tissue
281:1	239:2, 14	296:25	192:15	170:10
282:16, 24	240:12	298:3	195:1, 3, 9	323:9
283:6	243:15	319:5	202:14	tissues
288:8	246:7, 15	345:17	204:12	430:25
289:10	251:14	374:20	223:6, 11, 23	title 132:8
291:23, 24	263:25	383:6	226:23	286:19, 22
294:19	303:12	384:19, 22,	227:3	288:18
299:24	316:14	23, 25	236:14	412:15

titled 112:8 119:1 231:7 titles 14:19 tobacco 366:18 today 15:7 19:7 26:24 28:5, 24 29:23 43:10 47:14 57:15 78:1 80:1 91:13 99:17 103:18 108:11 112:20 116:11 152:17 155:14 160:15 172:7 178:12 206:14 207:13 209:5 314:17 319:13 324:5, 18, 23 330:25 332:24 333:20 338:5 349:21 351:12 357:6 361:13 363:4 365:12 376:5 395:17 424:5 440:21, 24	Today's 11:5 told 104:2 172:18, 21 176:16 183:8 228:19 287:19 299:22 394:10 403:23 411:1 427:3 428:10 437:15 440:6 441:6, 9 443:1, 2 tons 217:16 218:7 Tony 180:19 182:3 tool 359:13 tools 359:12 top 71:2 295:9 297:14 300:10 302:3 348:5 373:16 397:9 401:5 408:20 414:5 topic 149:25 269:12 365:3 420:7, 18 tortured 290:19	total 211:3, 8 213:9, 11 214:2 245:6, 10, 15 247:12, 23 248:15 342:25 344:19 totality 28:21 87:17 169:15 182:9, 11 186:3 197:21 207:4 213:7, 8 328:16 331:7 344:13 Totally 150:18 188:20, 24 318:18 319:6 toxic 293:11 toxicity 41:16 82:7 93:9 118:1, 13 187:20 189:24 190:2, 5, 14, 22, 23 191:1, 4, 7 323:4 345:21 372:13 toxicogenomi c 390:24 401:23 411:21 418:14 Toxicogenom ics 9:1	126:22 397:19 toxicogenomi c's 391:19 Toxicology 420:23 Tracey 1:12 2:3, 4 6:22 8:6, 8 12:7, 10 13:3, 7 23:18 67:14 81:22 93:18 95:12 96:16 97:18 103:2, 12, 22 104:16, 20 106:23 111:5, 14, 20 115:14, 18 141:5, 19 144:12, 25 146:23 147:8 148:2 164:11, 16 166:20 168:3, 10, 21 169:3 174:23 175:23 176:1 183:23 207:16, 25 208:5, 19 209:2 255:22 256:2 261:13 266:18 268:22 284:6, 19	308:16, 19 313:22 387:3, 7, 21, 25 392:18 394:9 398:3 400:19 401:15, 19 402:19 403:11 404:7, 8 406:12 407:2, 6, 19 408:1 409:20 410:11 411:19 414:19 415:6, 19 418:1 421:18, 23 422:23 423:22 424:7, 16, 19, 25 425:3 426:19 429:19 430:11 432:13 433:24 434:8 435:13 436:13, 24 437:6, 12, 16, 21, 22 438:1, 10, 13, 22 439:5, 7, 15, 24 440:16 444:1 tracking 151:23 153:7 346:17
--	---	--	---	--

trained 34:5 77:20, 22 83:8 173:16	treatments 44:1	truth 11:22, 23 445:4, 5	153:9 218:8	328:22 360:1
training 15:23 389:18	Tree 5:9	try 13:5	253:7	363:1
trait 382:3, 10	triad 272:3	43:1 54:15	257:7	376:11
transcript 99:3 272:12	trial 286:13	131:6	258:10	382:15
428:24	287:14	169:3	263:10	386:4
429:1, 9	288:25	209:1	295:3, 7	398:14
445:6	trials	219:19	297:14	402:4
446:16, 17	165:24	269:20	302:2	408:5
transcription 447:5	166:2	282:17	337:18	417:6
transcripts 99:7, 13, 15	287:12	337:9	347:7, 20	430:3, 4
163:7	trichloroethy	trying	370:16	433:4
translate 196:4 197:2	lene 182:18	169:13	382:23	two-dose 345:17
transmitted 13:13	TRICIA	199:25	386:2	twofold 267:20
transport 416:9	3:16	269:14	turned	two-thirds 225:10, 12
treat 66:11, 12, 13 110:9, 16, 19	tried 186:3	277:19	153:14	Tylenol 11:10
215:12	256:4	308:14	170:12	161:24
treated 45:6	trimester	317:21	turns	162:12
108:23	21:21	421:18	260:14	208:7
229:19	22:15	423:13	twinning	403:20
361:24	23:24	TSI 10:4	265:15	type 89:24
362:1	251:7, 15	349:17	two 12:18	90:1
treating 337:3	383:24	tube 16:3, 6, 9, 16 21:19	20:9 31:2	121:14
treatment 335:17	385:11, 13, 17	22:23 24:4	34:14	192:10
346:22	trimesters	25:6 33:7	116:5, 8	225:23
347:11	383:6, 20, 25	35:6, 14, 19	128:12	294:14
	TRINH	37:21 42:2	155:14	322:15
	6:17	53:10	164:8	396:10, 15
	trio 359:23	55:16 69:3	174:20	397:19
	triple	85:4, 5	181:7, 9, 11	408:14
	232:11	188:15, 20	198:8	typed 262:5
	trisomy	250:15, 17	201:11	types
	355:8, 10	354:14	219:15	121:17
	trouble	400:16	220:10, 15	139:1
	411:18	401:1	228:24	191:6
	true 148:24	tumors	245:11	199:18
	330:18	355:15, 16, 19, 21	248:3	280:18
	356:19	356:19, 22, 24 357:5	256:12	typical 422:25
	379:9	turn 116:21	258:22	
	381:17	150:10	262:19	
	405:24	151:25	270:24	
	Trujillo		271:23	
	184:7, 8		315:22	
			325:6	

typically 73:11 88:1 121:20 131:22 191:11 198:13 277:23 345:16, 17 359:22 368:13 386:17 typo 258:15 265:2, 3 typographica l 18:2 256:19 259:13 Typos 17:24 18:2 261:21 263:4 < U > Uh-huh 37:24 94:16 95:23 334:18 ultimate 308:21 ultimately 53:12 103:17 224:23 325:2 unaccounted 377:5 unadjusted 270:8 276:2 unanimous 82:12, 16 unaware 152:24	367:13 382:9 unbecoming 440:18 uncertain 349:6 uncertainties 350:24 uncertainty 350:8 unchanged 239:18 241:25 244:14 247:3, 10, 21 248:14 251:21 unclear 82:20 222:5 240:11 uncontrolled 268:11 undergrad 34:6 undergradua te 389:24 423:21 underlying 60:1, 4 159:4 200:21 298:14 382:14 392:6 415:25 understand 14:11, 20 54:5 87:21 100:24 138:5 171:11 216:7	229:22 244:13 250:9 311:2 316:24 343:1 352:6 404:4 422:4 understandin g 46:11 48:21 72:3 97:2, 7, 23 124:16 138:9 141:21 143:15 144:18 175:15 190:19 195:16 215:24 226:9, 20 245:13 252:24 272:13 281:14 283:24 304:25 310:12 379:7 380:4 391:23 understood 44:14 185:15 264:25 282:3, 24 289:11 399:5 undertaken 282:1 unethical 204:6	unexpected 94:13 unexposed 243:10 unfamiliar 51:14 149:25 unfortunate 385:18 unfortunatel y 150:11 218:23 295:4 335:5 uniform 76:15 UNITED 1:1 11:12 166:5 332:14 389:6 400:22 universities 106:6 University 388:17 390:1 Unknown 6:19 46:1 373:8, 20 374:13 375:9 376:18, 24 377:6, 8, 25 378:8, 20 unmatched 281:1 unmeasured 375:9 376:17, 23 377:5 unshared 271:19, 22 276:6	untreated 45:6 362:4 updated 269:6 updates 46:23 upfront 359:17 upregulated 431:15 upregulates 430:19 upregulation 406:8, 19 upsetting 436:11 usage 228:14 273:1, 11 use 9:7, 18 10:8, 9 48:7 50:23 52:8 89:23 110:23 121:23 123:10 147:6 157:15 158:11 160:6, 19, 20 171:19 173:21 174:10 185:10, 11 186:7 191:20 199:21 211:15 212:8, 15 213:22 214:5 215:4, 11, 12 219:6, 20 221:9
--	--	--	--	--

225:21	Utero 9:11	403:6	versions	volunteered
253:13, 14	36:4 98:12	406:24	139:13, 24	348:9
254:23	164:20	407:21	versus	365:11
267:25	200:11	value	131:21	
270:3, 25	259:3	249:12	247:3	< W >
273:21	339:23	368:14	277:20	
287:5	361:4	values 247:5	vice 197:18	WAGSTAFF
290:18	utility 10:1	variable	237:19	3:9
292:8, 10, 22	290:14	377:2	video 11:8	Wait 111:5,
310:21	342:19	variables	VIDEOGRA	6
326:20		276:6 367:7	PHER 11:1,	wake 387:2
334:8	< V >	variance	3 86:10, 13	walk 327:23
348:16	vacation	359:24	150:24	wall 292:9
351:25	15:8 440:24	Variants	151:2	Walmart
358:8	vaccinate	8:23 416:9	166:17, 22,	5:19
365:5, 20, 21	149:6	variation	25 255:11,	Wal-Mart
366:19	vaccinated	241:3, 22	14 314:3, 6	5:20
373:10, 21	148:19	variety 46:3	353:24	Walters
374:5, 6, 8,	vaccination	various	354:2	1:13 6:22
15 381:6	80:8 81:3	122:17	387:14, 17	want 19:10
383:22	vaccine	203:22	444:4	26:3 62:25
385:12, 13,	80:12	234:21	Videotaped	65:19
15 386:7	148:20	256:11	1:11	100:25
400:8	149:8	338:20	view 78:13	103:15, 23
405:2	vaccines	358:15	85:8 209:7	117:2
409:7	82:24	361:10	285:4 349:9	121:14
418:2, 17	validity	420:17	viewer	123:9
users	313:15	vary 113:17	431:20	134:18
363:24	valproic	vast 123:23	virtual	137:7, 10, 13
366:3, 17, 18	40:24	201:13	216:21	147:13, 16
uses 52:1	41:13, 17, 20	vehicle	visual 194:1	149:5
56:18	42:2, 16	336:23	visually	150:14
194:1	43:16, 17	vein 33:6	194:4	152:5
382:4	44:1, 4, 24	verbal	vitamin	159:9
383:19	45:2 49:18	396:23	400:2	161:19
usually	70:4, 20	verbatim	vitamins	163:18, 24
173:18	198:14, 15	445:6	400:4	164:9
362:18	337:6	verify	vocalize	166:15
UT 32:22	347:9, 14	103:19	191:18	169:7
33:4 92:19	358:9	versa	voice 285:10	181:22
105:25	397:9, 11, 21	197:18	volume	184:11
106:5	398:1, 7	237:19	290:16	208:10
uterine	401:21	version		212:3
252:14	402:7, 17, 22	284:11		235:9

245:4	warnings	322:3	15 225:24	81:15 82:5
257:21	332:25	325:20	257:14	83:19
258:23	Washington	336:3	260:15, 21	85:22
262:11	4:17 5:3, 18	341:19	261:2, 3	95:18
272:3	WATTS	372:14	277:24	100:23
284:13	3:1, 3, 4	401:6, 8	345:20, 22,	102:11
290:19	13:9 64:11,	403:10	23 366:18,	103:10
313:11, 19	17 86:4, 7	411:1, 20	22 411:2, 5,	104:16
318:4	150:4, 8	421:22	10	110:21
328:6	164:15	429:20	weighted	111:15
341:14	169:5	431:7	358:16	112:5
365:6	338:13	433:4, 25	Welcome	114:17
369:15	387:2, 9	443:21	13:9 167:4	115:2, 3
387:7	way 15:16	ways 41:6	255:18	118:24
388:4	20:1 31:23	368:22	314:13	120:19
391:17	52:11 66:3	423:14	Well 17:7	122:23
396:4, 11, 16	67:5, 25	weaknesses	21:1 22:8	127:12
404:2	100:10	271:20	26:14 27:3,	130:14
406:18	110:19	website	21 29:4	131:6, 11
408:16	137:1, 3	154:8	31:14, 24	132:11
410:20	139:21	WEDNESDA	32:7 33:20	133:14
412:9	146:11	Y 1:6	36:1, 16	141:13
413:7	148:3	week 16:23	37:12	142:4, 23
419:24	172:17	18:4	38:12, 21	143:17
431:13, 16	193:17	113:12	41:6 42:13	146:2, 10
433:10	194:25	256:14	44:16, 25	147:18
435:19	196:5, 12	weeks	46:17 47:9	153:5
439:8, 19	209:8	37:22	48:2, 11, 13,	155:7
wanted	226:15	119:23	17 49:13	159:2, 7
114:14	229:3	160:6	50:18	165:12
221:22	230:1, 13	209:22	52:18 54:3,	166:2
235:6	240:23	223:13	13 55:22	168:21
290:16	242:25	237:5, 6, 8	56:14, 20	169:3
306:24	251:5	250:11, 20	58:7, 17	172:5
320:9	265:18	251:3	59:15	174:8, 17
340:22	266:6	376:12	60:11, 17, 23	180:24
wants 387:9	282:8	weigh 83:8	62:6 63:17,	181:19, 25
war 67:12,	284:22	213:1	25 64:22	182:16
19, 24 236:3	285:5	332:18	68:25	184:13
warning	290:17	weighed	70:20 74:8	187:6
49:20 50:1	292:20, 23,	283:24	76:11, 18	188:8, 23
147:2	25 293:9	411:7	77:6, 25	190:18
155:3, 5	294:18	weight	79:12	192:22
	295:5	56:23 62:7,	80:20	194:16

195:14	294:21	411:20	229:13	whole-
198:8	295:6, 23	419:8	230:13	exome 75:2,
201:12	296:9	421:4	238:10	4
202:3, 11	303:5	422:16	240:20	Wholesale
205:14	304:5, 12	423:1	244:23	5:4
206:7, 25	307:20	426:21	245:2	wide 76:9
208:19, 23,	311:5, 11	431:17, 22	253:8, 10	widely
25 210:22	315:14	432:5	269:12	109:12
215:13	321:23	436:10	287:11	335:6
216:22	323:6, 22	437:8, 12	292:5	wife 107:16
218:3, 10	325:12	well-being	302:3, 5	389:25
219:18	326:6	74:5	303:15	willing
223:7	329:2, 21	went 32:10	320:13	357:12
224:13	339:25	40:4	327:12	Wilson
226:24	340:4	122:18, 19	338:3, 4	190:7
228:16	341:14	137:8, 9, 11,	351:11	window
229:9	344:24	12 175:5, 9	353:20	21:1, 4, 13,
234:25	349:18	229:2	354:9	16 22:5, 11,
237:1	352:6, 13, 17	252:7	379:2	17 23:1, 9,
238:5	356:20	267:17	393:6	21 227:3
240:6, 24	357:25	281:24	394:15	250:16
241:5, 7, 18	358:21	352:22	395:2, 3	windows
242:23	359:11	443:2	398:17	20:20
244:16	360:1	we're 23:2	410:2	wish 318:25
248:15	361:22	25:7 48:20	429:10	withdraw
249:20	362:3, 19	58:23 61:3	433:8	116:18
250:24	366:22	70:1, 7, 11,	West 5:8, 23	witness
258:13, 22	369:12	23 71:4	we've 13:21	11:18
260:11, 12,	371:7, 10	88:25 90:9	20:15	23:19 50:6
22 261:22,	375:4, 15	95:11	22:19	67:16
25 264:15,	376:4	108:10	35:11 38:7	81:24
21 265:9	377:3, 7	131:16	41:6 71:15,	96:19
272:1, 23	379:23	132:11, 12	22 72:18	97:20
273:6	380:2	154:6	86:4	103:3
274:11	381:17	155:10	117:21	104:7
275:24	384:21	167:8	178:7	106:24
276:1, 21, 25	387:23	177:20	204:5	141:6, 20
281:1	389:5	180:16	314:17	144:15
282:5, 15	395:12	199:3	328:8, 11	145:2
285:14	396:7, 13	201:10	358:7	146:24
286:9, 19	400:17	202:24	378:23	155:16
287:18	401:3, 15	207:25	398:12	164:16
292:7	402:1	217:12	410:18	172:20
293:12	405:20	223:13, 21	When's 98:4	175:25

176:5	436:10, 19	137:1, 3	364:9	write
177:1	437:10	164:6	381:23	283:14
183:24	438:21	292:21	390:3, 6	370:21
212:9	439:22, 25	315:10	400:15	373:7
261:14	441:13	344:16	413:2, 5	375:8, 12
268:23	442:17	431:8	421:2	377:14
272:8	444:3 446:1	work 14:25	443:18	writing
284:14	witnesses	15:18, 21	worked	19:8 112:16
313:19	168:11	16:5 40:12,	92:24	written
335:3, 19	woman	20 41:4, 7	95:16	292:2
337:1	110:10	45:18	389:21	wrong
338:7, 23	201:1	49:25	425:19	206:7
340:13	249:17	50:23, 25	426:8	261:6
341:14	336:22	52:24	working	262:1, 5
342:14	women	53:10, 13, 14	25:5 34:24	263:5, 6
344:9	45:5 48:3	54:8, 12	52:17	276:19
347:6	110:3, 16	55:1 68:1	106:25	287:22, 25
353:10, 23	147:6	71:12, 17, 19	380:7	297:25
374:19	166:11	74:1 85:6	423:17	302:6
378:2, 22	200:23	91:21, 22	works 19:3	317:20
382:8, 18	228:24	92:16	240:23	329:19, 20
384:3	251:1	94:15, 24	253:4	419:16
385:22	334:25	95:5, 6, 8	298:8	wrote
387:6	336:15	99:6	307:15	119:22
392:15	365:4, 19	105:24	323:6	283:15, 17,
394:6	wonder	106:5, 21	343:4	19 376:17
397:24	248:1	141:9, 10	403:10	Wuhan
400:14	Woodland	158:6, 16	World	28:13, 19
402:4	6:13	159:7	52:21	
407:15	word 27:23	162:17	53:23	< X >
409:19	126:11, 24	163:2	83:17	Xenobiotics
410:9	129:24	170:1, 2, 16,	222:23	8:24
411:15	131:2	18 189:17,	229:17	129:16, 17
414:17, 25	132:19	18, 20, 21	288:9	Xie 324:22
417:19	195:15	198:9, 13	308:13	
422:22	214:4	217:4	357:8	< Y >
423:25	260:9	238:6	376:6	y'all 395:16
424:21	412:10	256:5	408:10	Yeah 12:10
425:5	422:19	260:12	worldwide	13:11
428:20	432:15	278:20	421:12	21:23 28:9
429:5, 15	words	292:10	worry	29:24 36:9
433:21	26:13 30:7	307:10	240:20	38:18
434:2, 19	129:13	343:11	357:22	41:10
435:8	133:3	353:22	worse 59:14	43:12

47:11	278:2	21, 22 37:4		
64:16	296:11	53:7 93:5		
68:17 85:1	308:4	98:6 99:19		
86:6 88:22	313:22	113:16		
90:17	318:13	179:13		
92:17 96:3,	323:25	183:10		
7, 8 97:20	337:13	287:18		
103:12, 15	339:9	339:1, 4		
115:16	342:1	351:20		
126:1	345:4	352:21		
132:20	349:19	379:8, 12		
135:16	351:8, 18	380:1, 12		
142:15	353:4	388:1		
144:15	358:1	413:24		
145:2	359:22	Yep 152:9		
150:19, 22	363:9, 13	301:25		
152:12	364:20	321:16		
158:15	373:13, 15	YORK 1:1		
166:9, 18	375:19	2:24 5:8,		
173:9	381:22	14, 24 6:8		
174:6	387:3	11:13		
175:13	391:15	Ystrom		
178:5	394:13	10:16		
180:9	408:17	267:11		
197:19	414:10	269:3		
201:18	416:25	380:18		
202:3, 10	417:3	Yuelong		
204:14	423:3, 20	248:21, 24		
207:8	431:3			
217:2	432:6	< Z >		
220:17	433:2, 23	ZOOM 2:3,		
231:1	435:19	12, 13, 14, 15,		
238:21	437:3	20, 21, 22		
239:10	year 29:14	3:4, 5, 11, 16,		
240:8, 17	43:10 93:3	22 4:3, 4, 15,		
243:6	315:6	20 5:1, 7, 12,		
244:20	350:2	17, 22 6:1, 7,		
245:1, 3	353:6	12, 17 108:1		
254:11	365:13			
256:2	368:2			
258:11, 14	years 25:4			
264:6	30:24			
266:7	34:25 35:7,			
276:18	8 36:13, 15,			